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Environmental
Cleanup Office

EVREN NORTHWEST INC.
environmental & natural resource consultants

P. O. Box 80747, Portland, Oregon 97280
Tel: 503-452-5561 Fax: 503-452-7669

Tuesday, August 19, 2008

Karen Tarnow
ODEQ – NW Region
2020 SW 4th Ave. Suite 400
Portland, OR 97201-4987

RE: Technical Memorandum: 2008 Storm Water Sampling
The Marine Salvage Consortium, Inc. (DBA Fred Devine Diving & Salvage, Co.)
6211 N Ensign St. Portland, OR 97217

Dear Karen,

Enclosed, please find a copy of our Technical Memorandum, entitled "2008 Storm Water Source Control Evaluation", for the above listed site address. Additionally, I have attached an additional Technical Memorandum that is referenced.

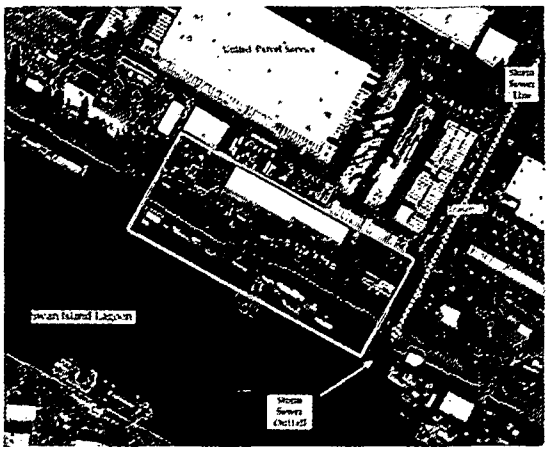
Should you have any additional questions or comments, please do not hesitate to phone.

Thank you,

Lynn Green
Project Manager

CC: J.H. Leitz, Fred Devine Diving & Salvage, Co.
Todd Zilbert, WOOD TATUM (Attorney)
LeAnn Bailey (Attorney)
Kristine Koch, Remedial Project Manager, USEPA, Office of Environmental Cleanup
1200 Sixth Avenue, M/S ECL-115, Seattle, WA 98101

USEPA SF
1290638



TECHNICAL MEMORANDUM

Storm Water

Source Control Evaluation

Fred Devine Diving & Salvage, Co.

6211 N. Ensign Street

Portland, Oregon 97217

August 13, 2008

Prepared for:

The Marine Salvage Consortium, Inc.

(dba Fred Devine Diving & Salvage, Co.)

Prepared by:

EVREN NORTHWEST INC.
environmental & natural resource consultants

P.O. Box 80747

Portland, Oregon 97280

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Project No. 521-07001-02(2008)

TECHNICAL MEMORANDUM

Storm Water Source Control Evaluation

Fred Devine Diving & Salvage, Co.

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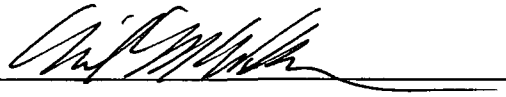
This technical memorandum has been prepared by EVREN Northwest, Inc. for The Marine Salvage Consortium, Inc.

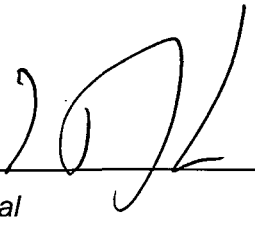
Project No. 521-07001-02(2008)

By



Neil M. Woller, R.G., *Senior Hydrogeologist*

And



Lynn D. Green, *Principal*

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Storm Water Source Control Evaluation

Fred Devine Diving & Salvage, Co.

6211 N. Ensign Street

Portland, Oregon 97217

1.0 INTRODUCTION

A storm water source control evaluation was conducted at the Fred Devine Diving & Salvage, Co. (FDD&S) facility at 6211 N Ensign Street, Portland, Oregon (Figure 1) in accordance with the Oregon State Department of Environmental Quality (ODEQ)-approved *Storm Water Source Control Evaluation Work Plan* (work plan).[1] This technical memorandum describes the work conducted and presents results of the *Evaluation*.

[1] EVREN Northwest, Inc., June 26, 2007, *Storm Water Source Control Evaluation Work Plan.* Approved in an e-mail by ODEQ on October 11th, 2007.

2.0 SITE DESCRIPTION

The FDD&S property is:

- Located at 6211 N. Ensign Street, Portland, Multnomah County, Oregon 97217 (Figure 1).
- Comprised of 5.74 acres.
- Rectangular in shape with the long axis oriented northwest to southeast.
- Adjacent to the Swan Island Basin which borders the site's southwest side.
- Generally level with an approximate elevation of 20 feet mean sea level.[2]
- Zoned IG2i: General Industrial 2, with a River Industrial overlay.[3]

Site access is from N. Ensign Street to the eastern end of the property where a 7,000-square foot two-story office building (built in 1973) is located with associated vehicle parking. The central portion of the property is occupied by a 24,500-square foot warehouse/shop (built in phases in 1976 and 1995). Also centrally located along the site's southern side is a facility dock built in 1984. The western end of the site is graveled and used for miscellaneous storage. (See Figure 2, Site Map, and Figure 3, Aerial Map)

Surrounding properties are also zoned industrial. A large United Parcel Service distribution facility is located north of the site. N. Ensign Street and the Port of Portland Navigation Division facility are located to the east. U.S. Government property utilized by the Navy and Marine Corp for training and operations is located to the west. Across Swan Island Basin to the southwest is the Swan Island Ship Yard.

The City of Portland's storm water outfall M-1 discharges into the Swan Island Basin immediately adjacent to the southeast corner of the FDD&S property.

2.1 Site History

According to a Preliminary Assessment[4] for the property, the subject property area (Mocks Bottom) was created by the placement of dredge spoils by the City of Portland, starting in the 1930s. The site was undeveloped until construction activities began for the two-story office structure in 1973. In 1976, construction began on the 14,000-square feet eastern section of the current warehouse. In 1995 construction began on the 10,500-square feet

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[2] U. S. Geologic Survey, Topographic Map, Portland Quadrangle, 1990.

[3] Information obtained from www.portlandonline.com.

[4] Evergreen Environmental Management, Inc., June 28, 2001. *Preliminary Assessment for the Fred Devine Diving & Salvage, Co.*

western section of the current warehouse. City of Portland records indicate both buildings were connected to the city's storm and sanitary sewer systems during their initial construction.

Two (2) 2,000-gallon gasoline tanks installed in 1975 and one 4,000-gallon gasoline tank installed in 1979 were removed from the site in 1993. Based on the ODEQ tank decommissioning Change in Service forms completed by the tank decommissioning firm, the tanks had not leaked.

Two (2) minor environmental releases have occurred on the property, both of which were reported to U.S. Environmental Protection Agency's (EPA's) Emergency Response Notification System. The 1995 incident involved the accidental loss of some oil-stained absorbent pads from a torn garbage bag that fell into the lagoon from the FDD&S dock. The materials were quickly retrieved. A small sheen was generated which quickly dispersed. The 1998 incident involved a pallet of paint buckets that fell from a crane onto the deck of a barge. A small amount of paint entered the water from one of the buckets that broke open on the deck of the barge, which quickly was cleaned up with absorbent napkins. Another five (5) gallon container of paint entered the water; however was quickly retrieved intact and unopened by a driver. No other known or documented releases of petroleum products or other hazardous substances have occurred to exposed soil, on to the pavement, into the catch basins, or into the lagoon at the FDD&S site.

An Expanded Preliminary Assessment (XPA) was performed at the site in 2003 by Evergreen Environmental Management, Inc. (EEM)[5]. The XPA included sampling of surface soils and catch basin sediment and analyses for selected heavy metals, semi-volatile organic constituents (SVOCs) and polychlorinated biphenyls (PCBs). According to the ODEQ website[6], elevated levels of phthalates and polynuclear aromatic hydrocarbons (PAHs) were detected in the sediment samples. EEM therefore conducted additional investigation regarding impacts of phthalate esters to catch basin sediment. During the XPA sampling event, packing materials (Styrofoam 'peanuts') were observed in the landscaped areas of the property and in several of the catch basins. The source of the packing 'peanuts' was attributed to the UPS facility located to the north. A sample of the packing 'peanuts' was collected on September 20, 2006, and analyzed for phthalate esters. Laboratory results indicated the presence to two (2) phthalate esters, bis(2-ethylhexyl)phthalate at up to 0.650 milligrams per Kilograms (mg/Kg), and butyl benzyl phthalate, at up to 5.7 mg/Kg. Phthalate impacts are suspected to have originated from the packing 'peanuts' from the offsite source. A follow-up investigation was conducted by ENW

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[5] EEM. March 19 2003. *Revised Sub-Surface Soil & Catch Basin Debris Sampling Report.*

[6] http://www.deq.state.or.us/wmc/ECSI/ecsidetailfull.asp?seqnbr=2365

to further evaluate potential sources for phthalates impacts to storm water at FDD&S. The results of this subsequent investigation are documented in a technical memorandum.[7]

2.2 Site Use

FDD&S provides diving and salvage services to the marine industry. The majority of FDD&S' work is conducted offsite (away from the FDD&S location); their facility is primarily used for administration and storage and maintenance of company equipment.

FDD&S offices are on the second floor of the office building; the first floor is leased to National Response Corporation (NRC) for office uses. Personnel vehicles are parked on the north and west sides of the office building; the parking lot is asphalt-paved.

FDD&S occupies the older, 14,000-square foot, portion of the warehouse, which is predominantly used for the maintenance and storage of boats and gear used in the diving and marine salvage work. According to a previous assessment, a 10-foot long floor drain historically connected to the sanitary sewer system was intentionally plugged inside the structure several years ago and therefore is no longer functional. The warehouse is also used for occasional cleaning and painting of FDD&S equipment; a floor drain in that portion of the warehouse flows to an oil/water separator connected to the municipal sanitary sewer system. However, according to a site representative, the discharge line from the oil/water separator has always been kept closed by a valve, thereby isolating the separator. The separator only occasionally receives discharges from the warehouse's shop and small paint room. The separator is pumped out and cleaned at least once a year by an outside contractor.

The western section of the warehouse, which was built in 1995, was specifically constructed for the former Smith Technology Corporation, which subsequently went out of business in 1997. That section of the warehouse was vacant for several years until FDD&S leased it to Atlantic Logistics, Inc. in 2000 for the storage of miscellaneous equipment removed from ships at the Swan Island Ship Yard. The western section of the warehouse is currently occupied by NRC.

The dock is primarily used by FDD&S for securing their work boats and barges. The dock is also used by other parties for mooring commercial and private motor and sailing vessels such as the river excursion vessel "Sternwheeler Rose." The dock was built in 1984 and extends into the Swan Island Lagoon.

The northwestern end (graveled) and southwest-central (paved) sides of the property are open spaces used for storage of equipment by Nviro, Inc.[8], NRC, and FDD&S. Generally,

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[7] ENW. July 25 2008. *Technical Memorandum: Wind Blown Packaging Materials, Probable Source of Phthalates in Storm Water.*

equipment stored in this area consists of support trucks and trailers (generally covered or enclosed), rigging and scaffolding (metal and painted metal), and some piping (metal and plastic). The southwest-central portion of this area is also used by FDD&S for vehicle parking, equipment staging and short-term storage of equipment and materials.

2.3 Storm-Water System

The majority of the impervious surfaces on the site's central and eastern sides drain to six (6) catch basins spaced relatively evenly through the paved areas (see Figure 4, Site Storm Water Map). The six (6) catch basins drain to a common storm sewer line where it commingles with storm water from up-gradient sources and outfalls to the City of Portland's storm-water sewer system, eventually discharging to the southwest to the Swan Island Basin at City of Portland outfall M-1.

Storm water falling on the warehouse's metal roof drains to the asphalt pavement and subsequently to one of the catch basins. The metal roof has been painted; therefore the roof is not expected to contribute metals to the storm water.

Storm water falling on the western graveled portion of the site ponds and infiltrates into the soil.

Catch basins at the site are approximately (2) two feet in diameter and approximately 2.5 feet deep. The water outlets are inverted at 22 inches from the top, providing a settling sump as well as a trap for floating materials.

[8] Nviro, Inc. is a sandblasting company. All work performed by Nviro, Inc. is performed offsite, and no sandblast related wastes are stored on the FDD&S site.

3.0 STORM WATER POLLUTION PREVENTION AND SOURCE CONTROL MEASURES

This section describes current and planned source control measures and best management practices (BMPs) to reduce storm water contamination at the site.

SWPCP: A storm water pollution control plan (SWPCP) is being prepared for the site. Subsequent items listed within in this section will be included in the SWPCP. Based on future monitoring results this plan may be revised to incorporate new or change existing BMPs, as appropriate.

Employee Education: Employee education in spill prevention and cleanup is already ongoing. Additional emphasis on potential storm-water impacts will be given consistent with the SWPCP. Employee training about the SWPCP will be completed with, and documented as an attachment to, the SWPCP.

Tenant Education: Tenant training for other occupants of the property about the SWPCP will be completed with, and documented as an attachment to, the SWPCP.

Spill Response: As part of the employee education program, personnel working on the dock, in the warehouse or in the yards will be trained in spill response. Spill response kits will be developed and maintained in easy-to-access locations, as appropriate. Tenants working on-site outside of the office will also be required to receive spill response training, and this training will be documented in the SWPCP.

Stenciling: The message "Dump No Waste, Drains to Willamette River" has been stenciled next to each of the catch basins.

Sign Posting: Signs will be posted in the office parking lot and around the paved space between the warehouse and the dock indicating that vehicles and equipment are not to be washed in areas that drain to the catch basins.

Settling: The six (6) catch basins are designed to trap and settle out particles (sediment). Frequent removal of this sediment keeps any contaminants in the sediment from leaving the site with storm water.

Debris Removal: A regular program of catch basin and storm-water conveyance system cleaning has been implemented. FDD&S conducts this work, or contracts with a company knowledgeable in storm-water system cleaning, such as NRC, to conduct this work in accordance with the City of Portland Bureau of Environmental Services (BES) protocols. At a minimum, the catch basins are inspected every three months and cleaned before the depth of solids reaches one-third the depth from the basin bottom to the invert of the lowest pipe into or out of the basin. Additionally, the catch basins are inspected regularly and any leaves and trash are promptly removed between cleanings.

Exposure Reduction: On-site activities involving materials with any significant potential to impact storm water are conducted inside the warehouse (under cover). If any equipment or materials with the potential to impact storm water is staged or stored short-term in open areas, these items will be covered during precipitation events.

Oil & Grease Reduction: Absorbent booms were previously maintained in the catch basins to reduce the amount of any oil and grease in storm water. However, this practice was terminated after determining that the absorbent booms have the potential to introduce phthalate esters into the storm water. The inverted outlets of the catch basins trap phase-separated (floating) oil and grease in the catch basin.

Filtration: Filter fabric has been installed on all six catch basins to trap debris entering the catch basins. Frequent inspection and removal of trapped debris is conducted to minimize the potential to leach constituents from trapped debris during storm water events.

4.0 SAMPLING ACTIVITIES

The *Storm Water Source Control Evaluation Work Plan* specified the collection and analysis of catch basin sediment and storm water to evaluate the potential for site-related contaminants to impact the Willamette River via the City of Portland storm sewer line.

4.1 Deviations

In a deviation from the *Work Plan*, catch basin sediments were not sampled during the monitoring events because insufficient materials were present in the catch basins to sample. This was a result of FDD&S' Best Management Practices which include routine maintenance and cleaning of the catch basins. This was discussed with the ODEQ project manager and FDD&S was advised not to discontinue BMPs for the purpose of accommodating sediment sampling.

Also, not all storm-event criteria were met and representative "first-flush" samples could not be collected during each storm event. Section 4.4 presents the details on these deviations.

4.2 Catch-Basin Sediment Sampling

On November 28, 2007, March 26, 2008, and June 11, 2008, all catch basins were opened and observations and measurements of materials in the catch basin were made. Table 4-1, below, summarizes these observations and measurements. During these inspections only *de minimis* amounts of sediments were observed. (Note that depth measurements primarily correspond with leaves collected in the basins.) At no time during these inspection events were sufficient sediments present to collect a sample. This absence of material is attributable to FDD&S' implementation of Best Management Practices including regular catch basin maintenance and cleaning.

Table 4-1. Catch Basin Observations

Catch Basin	Depth to Bottom (in.)	Depth to Sediment (in.)	Sediment Thickness (in.)	Comments
November 28, 2007				
CB-1	38	34	4	Floating debris; Abundant leaves in bottom.
CB-2	38	36	2	Floating debris
CB-3	32	31.5	0.5	Floating debris
CB-4	31	30	1	Floating debris; oil sheen leading from parked trucks to CB-4
CB-5	32	29	3	Floating debris
CB-6	32	27	5	Floating debris; Abundant leaves in bottom.
March 26, 2008				
CB-1	38	36	2	Slight sheen observed flowing into CB-1; silty turbid water from gravel area flowing into CB-1
CB-2	38	38	0	Slight sheen observed flowing into CB2
CB-3	32	32	0	---
CB-4	31	31	0	Slight sheen observed flowing into CB-4
CB-5	32	32	0	Slight sheen observed in Sampling Point SP-01
CB-6	32	32	0	---
June 11, 2008 (Period of Sustained Dry Weather)				
CB-1	38	36.5	1.5	Floating debris in all catch basins, including styrofoam packing peanuts in most. No flow observed; no surface water drainage to catch basins.
CB-2	38	38	0	
CB-3	32	32	0	
CB-4	31	30.5	0.5	
CB-5	32	32	0	
CB-6	32	32	0	

4.3 Storm-Water Sampling

Storm-water samples were collected and analyzed following the methodology described in the *Work Plan*. EVREN Northwest, Inc. (ENW) personnel collected grab samples representative of storm-water discharge from a manhole located between Catch Basins #5 and #6, prior to where storm water from the site enters the City of Portland storm sewer line. It is believed that this location is most representative of storm-water discharge leaving the site and entering the City of Portland Storm Sewer Line. This manhole has been informally designated Sampling Point SP01 (see attached site diagram, Figure 2).

ENW used *Work Plan*-specified storm-event criteria (discussed in Section 4.3) to select the storm events to be sampled. Four (4) storm-water sampling events were conducted over a year on the following dates:

- November 16, 2007
- November 28, 2007

- March 26, 2008
- May 20, 2008

4.3.1 Storm-Water Sample Collection Methods and Procedures

Four "grab sample" storm-water sampling events were conducted over the first year following the methods and procedures outlined in the *Storm Water Source Control Evaluation Work Plan.* Prior to collection, all collection tools were decontaminated using a sequential wash of Alconox® solution, tap water from the City of Portland municipal water system, and finally with deionized water. Fresh nitrile gloves were worn during sample collection.

All samples were collected in laboratory-supplied containers from the central portion of the storm-water flow. The bottles were capped immediately after collection. Storm-water samples were placed in appropriate, laboratory-supplied, sample containers and labeled with project name, sample name, date and time of collection, name of sampler, analysis required, and preservation. The samples were then immediately placed in cooled storage until they were delivered to the laboratory under chain-of-custody protocols.

Field readings of storm-water parameters were recorded at the time of sample collection using a YSI meter; sampling records and field readings are documented on Field Sampling Data Sheets included as Attachment A.

4.3.2 Analytical Methods

ENW submitted the storm-water samples to Friedman & Bruya, Inc. of Seattle, Washington, for analyses according to Table 4-2.

Table 4-2. Analytical Methods

COIs	Analytical Method	Sample Container	Preservative and Handling	Hold Time
Metals (Cd, Cr, Cu, Pb, Ni and Zn)	EPA Method 200.8/6020	500-ml HDPE	Nitric Acid; Cool to 4°C	Six months
DRO (diesel-range organics) and RRO (residual-range organics)	NWTPH-Dx	1-Liter amber glass	Hydrochloric Acid; Cool to 4°C	14 days
SVOCs	EPA Method 8270c	1-Liter amber glass	Cool to 4°C	7 days until extraction; 40 days after extraction
PAHs	EPA Method 8270	1-Liter amber glass	Cool to 4°C	7 days until extraction; 40 days after extraction
Phthalates	EPA Method 8270	1-Liter amber glass	Cool to 4°C	7 days until extraction; 40 days after extraction
PCBs	EPA Method 8082	1-Liter amber glass	Cool to 4°C	7 days until extraction; 40 days after extraction
Total Suspended Solids (TSS)	Standard Method 2540D	1-Liter polyethylene	Cool to 4°C	7 days

4.4 Evaluation of Storm-Event Criteria

The following criteria were employed in the selection of storm events during which storm water samples were collected.

- Antecedent dry period of at least 24 hours (as defined by <0.1 inch of precipitation over the previous 24 hours).
- Minimum predicted rainfall volume of >0.2 inch per storm event.
- Expected duration of storm event of at least three (3) hours.

In addition, ENW attempted to collect two (2) samples representative of "first-flush" conditions (i.e., within the first 30 minutes of storm water discharge), and all samples within the first three (3) hours of storm water discharge, to the extent practicable.

Recorded storm-event data for the four sampling events are evaluated according to the above criteria in the rest of this section. Precipitation hydrographs for each sampling event showing rainfall for the 24-hour period prior to storm initiation, as well as storm event data and sample collection time are included as Attachment B.

4.4.1 Antecedent Dry Period

The antecedent dry period was evaluated using City of Portland Hydra Rainfall Network rain gauge 204 data.[9] Table 4-2 shows rainfall data obtained from the City of Portland Hydra Rainfall Network for the 24-hour period before each sampled storm event is as follows:

Table 4-3. Rainfall Data for 24 Hours Preceding Sampled Storm Event

Date	Measured Precipitation
November 15, 2007	0.17 inches
November 27, 2007	0.08 inches
March 25, 2008	0.30 inches
May 19, 2008	0.00 inches

As shown the 2nd and 4th sampling events met this storm-event criterion. The 1st and the 3rd sampling events exceeded the criterion; *note that ENW personnel attempted to meet all storm-event criteria in the selection of storm events to sample; however, real-world conditions did not always allow for all conditions to be met (see Section 4.4.4).*

4.4.2 Storm Rainfall Volume

All four (4) sampled storm events were predicted to have greater than 0.2 inches of rainfall. All but the last sampling event met this storm-event criterion. Actual rainfall data obtained from the City of Portland Hydra Rainfall Network were as follows:

Table 4-4. Rainfall Data for Sampled Storm Event

Date	Measured Precipitation
November 16, 2007	0.6 inches
November 28, 2007	0.4 inches
March 26, 2008	0.3 inches
May 20, 2008	0.2 inches

[9] Rain-gauge data from: http://or.water.usgs.gov/non-usgs/bes/raingage_info/clickmap.html (Station number 204, rain gauge located on Swan Island.)

4.4.3 Storm Event Duration

All four (4) sampled storm events had an expected duration of at least three hours. Actual storm durations are indicated in the precipitation hydrographs of Attachment B and all sampled storm events exceeded three (3) hours in length.

4.4.4 "First-Flush" Samples

ENW strived to collect representative "first-flush" samples (i.e., within the first 30 minutes of storm water discharge) for two (2) of the four (4) sampling events. The first and last sampling events (November 16, 2007 and May 20, 2008 events, respectively) were collected as "first-flush" samples. Each of these samples were collected as soon as practical (7:30 and 7 AM, respectively) following onset of the storm event. The remaining two (2) events (November 28, 2007 and March 26, 2008) were conducted within the first three (3) hours of storm water discharge, to the extent practicable.

The precipitation hydrographs in Attachment B show both sample collection time with respect to the hourly precipitation data (note that sampling times are shown as Pacific Standard Time, to correspond with the Hydra Rainfall Network).

4.4.5 Storm Event Details

Presented below are the specific conditions around which each sampling event was conducted.

November 16, 2007, Sampling Event

This sampling event followed a relatively long period of good weather associated with the end of the dry season. Only two days in the preceding portion of the month had precipitation exceeding 0.1 inch, with the higher rainfall recorded at 0.19 inch on November 9, 2007. The previous day had a total of 0.07 inches of rainfall at the end of the day, and precipitation was sporadic from midnight to the time of sampling (7:30 AM) which was within the first three hours of a major rainfall event.

November 28, 2007, Sampling Event

This sampling event followed two days of rainfall: two days prior was a 0.33-inch rainfall event and on the preceding day 0.08-inch had fallen between noon and midnight. The sampled storm event started around 12 noon with sampling at 3 PM. Since large rainfall events were also recorded on the days immediately following this sampling event, the November 28, 2007, event was performed near the onset of the Oregon wet season.

March 26, 2008 Sampling Event

This sampling event occurred as a late wet season (winter) event, with five of the preceding ten days exceeding 0.1-inch of precipitation. Precipitation began around 4 PM on March 25, and then became heavy through the night until around 3 AM. Rainfall began again around 9 AM, with sampling occurring around 10:30 AM.

May 20, 2008 Sampling Event

This sampling event was conducted in the early portion of the dry season. Of the preceding ten days, recordable precipitation had only occurred on one day, and on that one day only 0.07-inches of precipitation had been recorded. The rainfall on May 20, 2008 began around 3 AM and peaked at around 5 AM. Sampling was performed at 7 AM.

5.0 DATA SUMMARY AND EVALUATION

5.1 Catch Basin Sediment

As discussed in Section 4.1, above, catch basin sediment sampling was not conducted because insufficient sediments were present in the catch basins to sample. This was a result of FDD&S' Best Management Practices which include routine maintenance and cleaning of the catch basins.

Inspections conducted during the source control evaluation showed that the catch basins are adequately maintained with low sedimentation accumulation. Some floating debris and/or a slight sheen on storm water was observed on the inspection dates. The floating debris included Styrofoam packing peanuts, considered a possible source of phthalates.

Historic catch basin sediment sampling was conducted (April 30, 2002); results were presented in the *Work Plan*[1] and indicated that certain metals, PAHs, and a phthalate were detected above SLVs (screening-level values). The reader is directed to Section 4.0 (Sediment Screening) of the *Work Plan* for additional information.

There is little to no potential for catch basin sediments at the FDD&S site to impact the Willamette River via the City of Portland storm sewer line. FDD&S' implementation of Best Management Practices has shown, through a year of monitoring, to effectively eliminate sediment in the catch basins to *de minimis* amounts.

5.2 Storm Water

5.2.1 Field Parameters

Storm-water parameters were recorded at the time of sample collection using a YSI meter; in addition, the laboratory performed analysis for Total Suspended Solids (TSS) as an additional control to evaluate the analytical data upon completion of this investigation. Parameter results are presented in Table 5-1.

Table 5-1. Field Parameters

Date	Sample	Time	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	pH	Redox Potential (mV)	Total Suspended Solids (mg/L)	Visual/ olfactory Notes
11/16/2007	SP01-071116	7:30	10.91	190	98.1	7.00	27	16.4	Slightly turbid
11/28/2007	SP-1	15:00	9.82	145	76.2	7.18	48	43.6	Turbid
3/26/2008	SP-1	11:45	6.54	145	7.98	7.42	22.1	68.9	Sheen
5/20/2008	SP01-080520	7:45	15.16	33	5.73	7.39	55.4	26 (1)	Slightly turbid

°C = degrees Celsius.
mS/cm = microsiemens per centimeter.
mg/L = milligrams per Liter or parts per million.
(1) = Measured in the field
mV = millivolts.
NA = not analyzed.
NT = not tested

All parameters were within the normal ranges; however a sheen was observed on the water at the sampling point during the March 2008 sampling event.

5.2.2 Analytical Data

Analytical results for the four storm-water monitoring events are presented in Table 1 (behind text) with units of measurement, compounds detected, Method Detection Limits (MDLs), and Screening-Level Values (SLVs). Historical data for storm water at the site is not presented due to its limited nature.[10]

Copies of the laboratory reports and chain-of-custody documentation are included as Attachment C. This data is also presented in the electronic disk attached to this report (Attachment D).

Table 5-2, below, presents only **detected** constituents for each storm-water sampling event.

[10] In the *Work Plan,* constituents of interest for storm water were identified consistent with catch basin sediment based on the fact that only limited storm water sampling data was available.

Table 5-2. Constituents Detected in Storm Water

	Constituent	10/16/2007	10/28/2007	3/26/2008	5/20/2008
Metals	**cadmium**	*Not detected (ND), but MDL exceeded SLV*	**>SLV**	**>SLV**	**>SLV**
	chromium (total)	*<SLV*	*<SLV*	*<SLV*	*<SLV*
	copper	**>SLV**	**>SLV**	**>SLV**	**>SLV**
	lead	**>SLV**	**>SLV**	**>SLV**	**>SLV**
	nickel	*Detected at concentrations consistent with background concentration, no SLV established.*			
	zinc	**>SLV**	**>SLV**	**>SLV**	**>SLV**
Phthalates	butylbenzylphthalate	*~ND~*	*<SLV*	*~ND~*	*~ND~*
	bis[2-ethylhexyl]phthalate	*ND, but MDL exceeded SLV*	**>SLV**	*Detected during both events above SLV, but flagged by laboratory for QA/QC considerations*[11]	
PAHs	**naphthalene**	*ND, but MDL exceeded SLV*	*<SLV*	*~ND~*	**>SLV**
	acenaphthylene		*~ND~*	*~ND~*	*<SLV*
	fluorene		*<SLV*	*~ND~*	*<SLV*
	phenanthrene		**>SLV**	*<SLV*	**>SLV**
	anthracene		*<SLV*	*~ND~*	*<SLV*
	fluoranthene		**>SLV**	**>SLV**	**>SLV**
	pyrene		**>SLV**	*<SLV*	*<SLV*
	benz[a]anthracene		**>SLV**	**>SLV**	**>SLV**
	chrysene		**>SLV**	**>SLV**	**>SLV**
	benzo[b]fluoranthene		**>SLV**	**>SLV**	**>SLV**
	benzo[k]fluoranthene		**>SLV**	**>SLV**	*ND, but MDL exceeded SLV*
	benzo[a]pyrene		**>SLV**	**>SLV**	**>SLV**
	indeno[1,2,3-c,d]pyrene		**>SLV**	**>SLV**	**>SLV**
	benzo[g,h,i]perylene		*<SLV*	*<SLV*	*<SLV*
TPH	DRO (diesel-range organics)	*Both DRO and RRO were detected in all four storm-water samples. No SLV has been established. The laboratory flagged the Nov. 16, 2007 DRO detection as not indicative of diesel.*			
	RRO (residual-range organics)				

[11] Lab indicated that this constituent was also detected in the method blank; however at a much lower concentration. Therefore a small percentage of the resulting concentration may be from laboratory contamination.

5.2.3 Discussion

The following items are of note in regards to storm water leaving the FDD&S site:

- **PCBs** were not detected in any of the four storm water samples collected.
- Windblown Styrofoam packing peanuts from the UPS facility have been identified as the likely source of **phthalates** based on sampling and chemical fingerprint matching.[7]
- **Metals**: The metals detected above SLVs (cadmium, copper, lead and zinc) in storm water were detected at concentrations indicative of background concentrations for surface water in Oregon and/or are present at concentrations below State benchmarks for storm-water discharge. Cadmium was detected at a geometric mean concentration of 0.82 µg/L (micrograms per Liter), which correlates with ODEQ accepted background concentrations for surface water in Oregon[12]. Copper, lead and zinc were detected at concentrations that are below ODEQ's Industrial General Permit 1200-Z benchmark values.
- **DRO/RRO**: Diesel and residual (oil)-range organics were detected in all four (4) of the storm water samples collected. Likely sources are oil and grease drips in the parking lot. Detected concentrations were well below ODEQ's Industrial General Permit 1200-Z benchmark values.
- **PAHs**: As shown in Table 1 (behind text) certain PAHs only slightly exceeded SLVs while others exceeded SLVs by over an order of magnitude. PAHs are ubiquitous in an urban environment and one study conducted in the Los Angeles area concluded that, "The predominant source of PAHs in urban storm water in the greater Los Angeles area is from aerial deposition and subsequent wash-off of PAHs associated with combustion byproducts."[13]

  A chemical fact sheet[14] published by the Wisconsin Department of Health Services indicates:

  > *Most PAHs in the environment are from incomplete burning of carbon-containing materials like oil, wood, garbage or coal. Many useful products such as mothballs, blacktop, and creosote wood preservatives contain PAHs.*

---

[12] ODEQ. October 28 2002. Memorandum: Toxicology Workshop: *Default Background Concentrations for Metals.*

[13] Stein, Eric D. et. al. 2006. *Watershed-based sources of polycyclic aromatic hydrocarbons in urban storm water.* Environmental Toxicology and Chemistry, Vol. 25, No. 2, pp. 373-385.

[14] http://dhs.wisconsin.gov/eh/chemFS/fs/PAH.htm

They are also found at low concentrations in some special-purpose skin creams and anti-dandruff shampoos that contain coal tars.

Automobile exhaust, industrial emissions and smoke from burning wood, charcoal and tobacco contain high levels of PAHs. . .Fires can form fine PAH particles. They bind to ash particles and can move long distances through the air.

In addition to atmospheric deposition, potential onsite sources for PAHs are most likely consistent with the DRO detected in storm water – oil and grease drips in the parking lot area.

5.3 Non-Storm Water Discharge

Consistent with the *Work Plan*, an additional storm-water inspection was performed during a period of sustained dry weather, to determine any non-storm water discharge from the site to the City outfall M-1. This inspection was conducted on June 11, 2008. No surface water drainage to the catch basins was observed. Floating debris was observed within the catch basins, including Styrofoam packing peanuts.

5.4 Persistent Bioaccumulative and Toxic (PBT) Chemicals Detected

ENW accessed the EPA list of persistent bioaccumulative and toxic (PBT) chemicals to identify detected storm-water constituents on the list. The following detected constituents are listed as PBTs:

Category Name

Polycyclic aromatic compounds (PAHs)

Chemical Name (Individual)

Lead

Benzo[g,h,i]perylene

6.0 EFFECTIVENESS EVALUATION

The storm water source control evaluation conducted over the last year has identified pollutants in storm water leaving the FDD&S site. These include metals, phthalates, petroleum hydrocarbons and PAHs. The concentrations of metals and petroleum hydrocarbons in storm water met either background concentrations for surface water in Oregon and/or are present at concentrations below State benchmarks for storm-water discharge. (Neither background concentrations nor State benchmarks have been established for phthalates or PAHs).

The only pollutant identified in storm water leaving the FDD&S site with a clear source is the detected phthalates: wind-blow Styrofoam packing peanuts from the adjacent UPS facility are present in large quantities in the landscaping and routinely found in the catch basins. Currently FDD&S is discussing this issue with the adjacent property owner with the anticipation that they will be implementing a strategy to mitigate packing peanut migration from their property to the FDD&S property.

The other pollutants detected in storm water leaving the site are typical of parking lots. FDD&S is researching the use of various catch basin inserts that contain filter media that can be fitted into the existing system, are serviceable, and do not themselves leach potential pollutants to storm water discharge.

FDD&S' implementation of best management practices at the site resulted in a reduction of catch-basin sediment to a *de minimis* amount. Planned catch-basin sediment sampling was not conducted because not enough material was present in the catch basins to sample. Therefore, there is little to no potential for catch basin sediments at the FDD&S site to impact the Willamette River via the City of Portland storm sewer line.

FDD&S management is strongly committed to long-term implementation of storm water protection measures at their property and will ensure continued implementation of the source control measures and best management practices described in Section 3.0, including routine catch basin cleaning. To this end, a storm water pollution prevention plan (SWPCP) is being prepared to be used as a guide and for a tool in training employees and tenants. Inspection forms developed with the SWPCP will be used to assess site conditions and evaluate pollutant sources and the effectiveness of control measures. Measures will be put in place to address any identified sources of impacts to storm water.

7.0 LIMITATIONS

The scope of this report is limited to observations made during on-site work; interviews with knowledgeable sources, public agency personnel, and contractors licensed in the state of Oregon; and review of readily available published and unpublished reports and literature. As a result, these conclusions are based on information supplied by others as well as interpretations by qualified parties.

There is no practice that is thorough enough to absolutely identify all hazardous substances that may be present at a given site. No sampling program can thoroughly identify all variations in contaminant distribution. ENW's investigation has been focused only on the issue that was specifically identified within this Scope of Work (SOW), as outline in the work plan. Therefore, if contamination other than that specifically mentioned is present and not identified as part of the limited SOW, ENW's environmental investigation shall not be construed as a guarantee of the absence of such materials.

It is possible, despite the use of reasonable care and interpretation, that ENW may have failed to identify regulation violations related to the presence of hazardous substances other than those specifically mentioned in the SOW. ENW assumes no responsibility for conditions that it did not specifically evaluate or conditions that were not generally recognized as environmentally unacceptable at the time this report was prepared.

TABLES

TABLE

Table 1 - Summary of Analytical Results, Storm Water

Location ID		SP01		SP01		SP01		SP01		Maximum Storm Water Concetnration	Geometric Mean (1/2 MDL used if ND)	Lowest JSCS Screening Value	Background	1200-Z Benchark	RBDM Screening-Level RBCs (1)	EPA Region VI SSLs (1)
Sample ID		SP01-071116		SP-1		SP-1		0SP01-080520								
Date Sampled		11/16/2007		11/28/2007		3/26/2008		5/20/2008								
		Concentration	Method Detection Limit	Concentration	Method Detection Limit	Concentration	Method Detection Limit	Concentration	Method Detection Limit							
Constituent of Interest	Note	µg/L (ppb)								µg/L (ppb)		µg/L (ppb)				
Phthalate Esters																
Dimethylphthalate	c, v	<1 (ND)	*1*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	1	0.30	3	--	--	--	3.70E+05
Diethylphthalate	c, v	<1 (ND)	*1*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	1	0.30	3	--	--	--	2.90E+04
Di-n-butylphthalate	c, v	<1 (ND)	*1*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	1	0.30	3	--	--	--	3.70E+03
Butylbenzylphthalate	c, v	<1 (ND)	*1*	0.59	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	0.59	0.37	3	--	--	--	7.30E+03
Di-n-octylphthalate	c, v	<1 (ND)	*1*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	1	0.30	3	--	--	--	---
Bis[2-ethylhexyl]phthalate	c, nv	<10 (ND)	*10*	**2.9**	*0.5*	**3.1 J, fb**	*0.5*	**3.1 fbs**	*0.5*	**3.1 J, fb**	**3.44**	0.22	--	--	4.1	4.8
Polyaromatic Hydrocarbons																
Naphthalene	nc, v	<1 (ND)	*1*	0.15	*0.05*	<0.05 (ND)	*0.05*	**0.53**	*0.05*	**0.53**	0.18	0.2	---	---	6.2	6.2
Acenaphthylene	nc, v	<1 (ND)	*1*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	0.07	*0.05*	0.07	0.07	0.2	---	---	---	---
Acenaphthene	c, nv	<1 (ND)	*1*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<1 (ND)	<0.05 (ND)	0.2	---	---	370	3.70E+02
Fluorene	c, nv	<1 (ND)	*1*	0.11	*0.05*	<0.05 (ND)	*0.05*	0.093	*0.05*	0.11	0.11	0.2	---	---	240	2.40E+02
Phenanthrene	c, nv	<1 (ND)	*1*	**0.52**	*0.05*	0.13	*0.05*	**0.29**	*0.05*	**0.52**	**0.31**	0.2	---	---	---	---
Anthracene	c, nv	<1 (ND)	*1*	0.053	*0.05*	<0.05 (ND)	*0.05*	0.064	*0.05*	0.064	0.08	0.2	---	---	1800	1.80E+03
Fluoranthene	nc, nv	<1 (ND)	*1*	**0.45**	*0.05*	**0.24**	*0.05*	**0.23**	*0.05*	**0.45**	**0.33**	0.2	---	---	1500	1.50E+03
Pyrene	c, nv	<1 (ND)	*1*	**0.38**	*0.05*	0.18	*0.05*	0.15	*0.05*	**0.38**	**0.27**	0.2	---	---	1100	1.80E+02
Benz[a]anthracene	c, nv	<1 (ND)	*1*	**0.14**	*0.05*	**0.062**	*0.05*	**0.082**	*0.05*	**0.14**	**0.14**	0.0018	---	---	0.078	2.90E-02
Chrysene	nc, nv	<1 (ND)	*1*	**0.30**	*0.05*	**0.018**	*0.05*	**0.18**	*0.05*	**0.30**	**0.15**	0.0018	---	---	7.8	2.9
Benzo[b]fluoranthene	nc, v	<1 (ND)	*1*	**0.26**	*0.05*	**0.16**	*0.05*	**0.13**	*0.05*	**0.26**	**0.23**	0.0018	---	---	0.078	2.90E-02
Benzo[k]fluoranthene	c, nv	<1 (ND)	*1*	**0.081**	*0.05*	**0.057**	*0.05*	<0.05 (ND)	*0.05*	**0.081**	**0.09**	0.0018	---	---	0.78	2.90E-01
Benzo[a]pyrene	c, nv	<1 (ND)	*1*	**0.15**	*0.05*	**0.067**	*0.05*	**0.056**	*0.05*	**0.15**	**0.13**	0.0018	---	---	0.0078	2.90E-03
Indeno[1,2,3-cd]pyrene	c, nv	<1 (ND)	*1*	**0.15**	*0.05*	**0.080**	*0.05*	**0.056**	*0.05*	**0.15**	**0.14**	0.0018	---	---	0.078	2.90E-02
Dibenz[a,h]anthracene	c, nv	<1 (ND)	*1*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<1 (ND)	<0.05 (ND)	0.0018	---	---	0.0078	2.90E-03
Benzo[g,h,i]perylene	nc, nv	<1 (ND)	*1*	0.15	*0.05*	0.091	*0.05*	0.060	*0.05*	0.15	0.14	0.2	---	---	---	---
Polychlorinated Biphenyls (PCBs)																
Aroclor 1016	c, nv	<0.1 (ND)	*0.1*	<0.07 (ND)	*0.07*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.1 (ND)	<0.03 (ND)	0.96	---	---	0.96	9.60E-01
Aroclor 1221	c, nv	<0.1 (ND)	*0.1*	<0.07 (ND)	*0.07*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.1 (ND)	<0.03 (ND)	0.28	---	---	0.028	3.40E-02
Aroclor 1232	c, nv	<0.1 (ND)	*0.1*	<0.07 (ND)	*0.07*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.1 (ND)	<0.03 (ND)	0.58	---	---	0.028	3.40E-02
Aroclor 1242	c, nv	<0.1 (ND)	*0.1*	<0.07 (ND)	*0.07*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.1 (ND)	<0.03 (ND)	0.053	---	---	0.028	3.40E-02
Aroclor 1248	c, nv	<0.1 (ND)	*0.1*	<0.07 (ND)	*0.07*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.1 (ND)	<0.03 (ND)	0.081	---	---	0.028	3.40E-02
Aroclor 1254	c, nv	<0.1 (ND)	*0.1*	<0.07 (ND)	*0.07*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.1 (ND)	<0.03 (ND)	0.033	---	---	0.028	3.40E-02
Aroclor 1260	c, nv	<0.1 (ND)	*0.1*	<0.07 (ND)	*0.07*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.1 (ND)	<0.03 (ND)	94	---	---	0.028	3.40E-02
Aroclor 1262	c, nv	<0.1 (ND)	*0.1*	<0.07 (ND)	*0.07*	<0.05 (ND)	*0.05*	<0.05 (ND)	*0.05*	<0.1 (ND)	<0.03 (ND)	NE	---	---	---	---
Metals																
Cadmium	c, nv	<1 (ND)	*1*	**1.34**	*1*	**0.80**	*0.1*	**0.86**	*0.2*	**1.34**	**0.82**	0.094	<1	---	---	1.80E+01
Chromium (total)	nc, nv	1.92	*1*	5.32	*1*	3.13	*1*	98.7	*1*	98.7	7.49	100	1	---	---	110 (2)
Copper	c, nv	**21.7**	*1*	**74.1**	*1*	**30.8**	*1*	**48.1**	*1*	**74.1**	**39.3**	2.7	9	100		1.40E+03
Lead	nc, nv	**8.84**	*1*	**25.4**	*1*	**24.2**	*1*	**14.9**	*0.5*	**25.4**	**16.9**	0.54	13.3	400		1.50E+01
Nickel	nc, nv	2.16	*1*	5.22	*1*	2.77	*1*	3.62	*1*	5.22	3.26	NE	5.5	---		7.30E+02
Zinc	nc, nv	**321**	*1*	**457**	*1*	**299**	*1*	**395**	*1*	**457**	**363**	33	38	600		1.10E+04
Total Petroleum Hydrocarbons																
DRO	nc, nv	310	50	650	50	360 x	50	940	50	940	511	NE	---	10000	---	---
RRO	nc, nv	590	250	1100	250	1220	250	2000	250	2000	1122	NE	---			

Notes:

ND = not detected at or above laboratory method reporting limits

NE = not established.

µg/L = micrograms per Liter

GRO = gasoline-range organics.

DRO = diesel-range organics.

RRO = residual-range organics.

JSCS = Portland Harbor Joint Source Control Strategy, ODEQ and EPA, December 2005

x = Chromatogram pattern is not indicative of diesel

J = Sample is out of control limits, and concentration is considered an estimate

fb = analyte found in method blank, and should be considered an estimate.

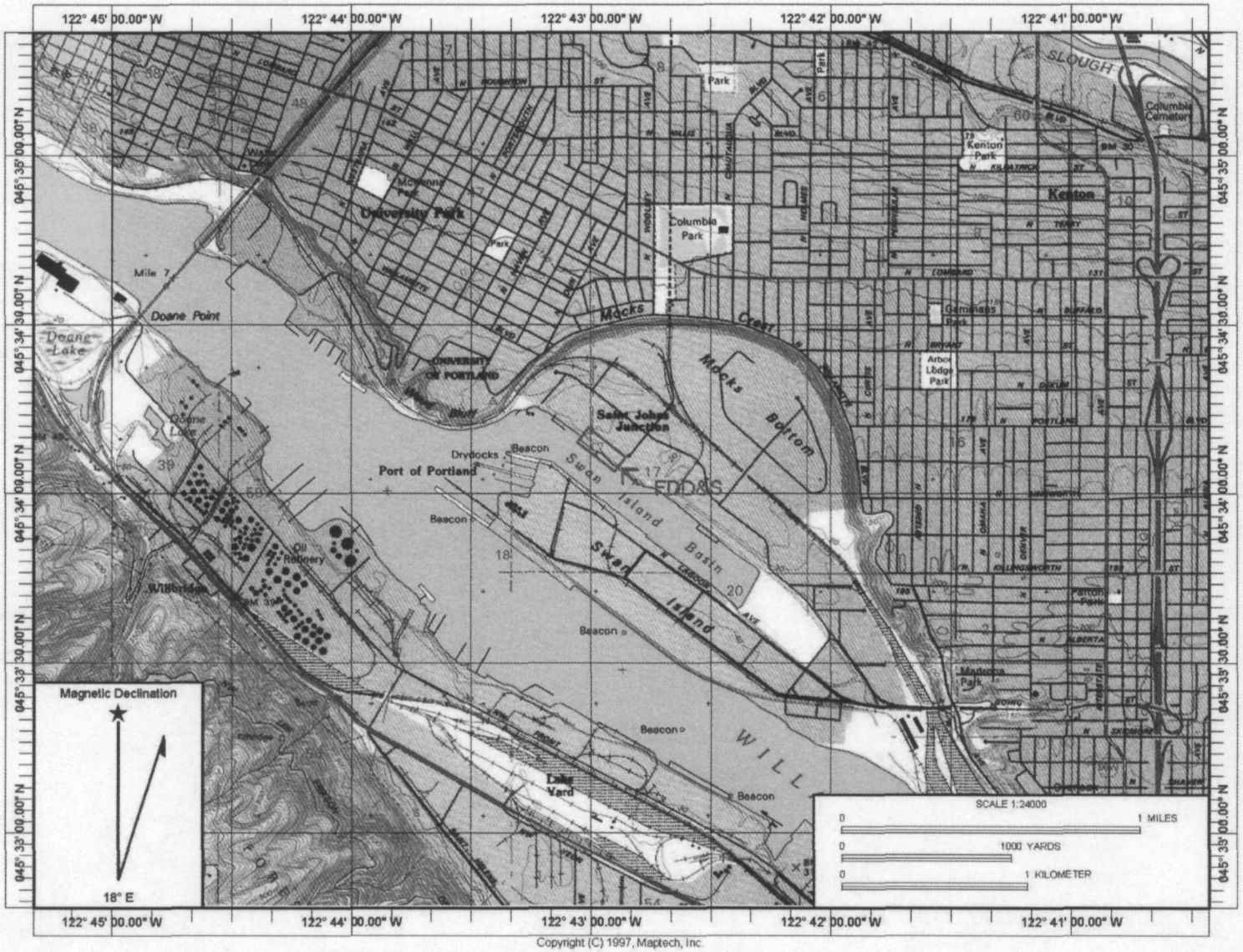
fbs = analyte found in method blank. A small percentage of the material present may be due to laboratory contamination.

(1) based on human health exosure to tap water

(2) as chromium VI to remain conservative

FIGURES

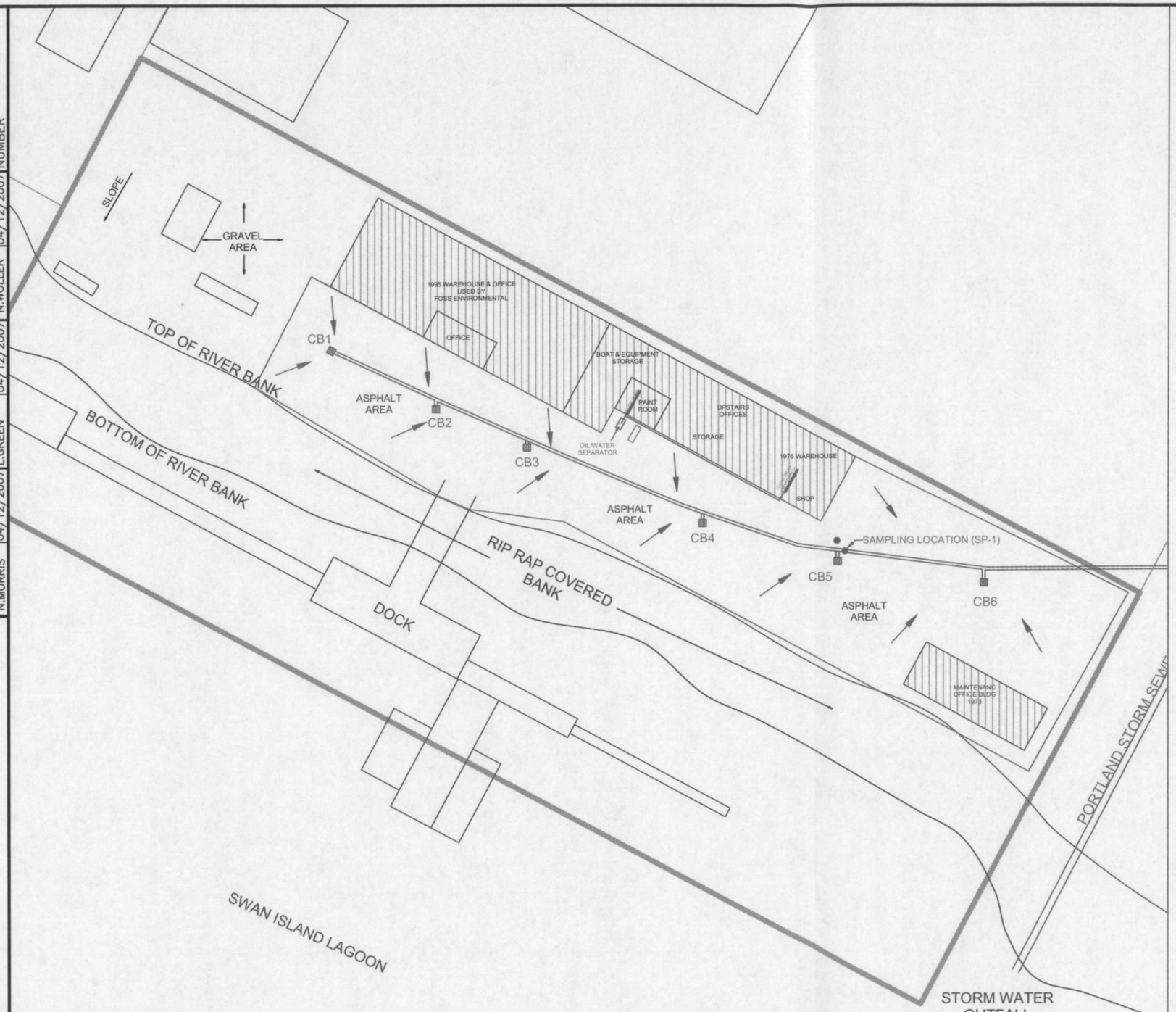
FIGURES



Source: USGS Topographic Map, 7.5-Minute Portland Quadrangle, 1990

EVREN NORTHWEST	Date Drawn: 4/11/2008 CAD File Name: 521-07001-01svmap.doc Drawn By: LDG Approved By: NMW	Fred Devine Diving & Salvage Co. 6211 N. Ensign Street Portland Oregon For: The Marine Salvage Consortium, Inc.	**Site Vicinity Map**	Project No. 521-07001-01 Figure No. **1**

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
N.MORRIS 04/12/2007	L.GREEN 04/12/2007	N.WOLLER 04/12/2007	521-07001(v01)



LEGEND:

- APPROXIMATE BUILDING LOCATIONS
- APPROXIMATE PROPERTY BOUNDARIES
- APPROXIMATE SUBJECT PROPERTY BOUNDARIES
- APPROXIMATE SUBJECT BUILDINGS
- APPROXIMATE LOCATION OF FORMER GAS UST
- CATCH BASIN
- STORM/DRAIN LINES
- APPROXIMATE BOUNDARY OF WATER RUNOFF
- DIRECTION OF WATER RUNOFF

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2005 AND EVREN NORTHWEST, INC FIELD NOTES.

APPROXIMATE SCALE

0 75 150 FEET

N

EVREN NORTHWEST
PO BOX 80747
PORTLAND, OREGON 97280-1747
(503)452-5561 Fax(503)452-7669

FIGURE 2

SITE PLAN

FRED DIVINE DIVING & SALVAGE FACILITY
6211 NORTH ENSIGN STREET
PORTLAND, OREGON

A

ATTACHMENT A FIELD SAMPLE DATA SHEETS

Check List for Visual Monitoring

FDD&S, Portland, Oregon

Monthly (when discharging)

Site Control FDD&D

Weather Conditions *Dry, cloudy, overcast*

Date of Inpection 6/11/2008

Time of Inspection 1000

Name of Inspector Mike Krzeminski

Catch Basins	Condition of Filter (Good/Poor/NP)		Presence/Thickness of Oil or presence of sheen	Floating material/debris	Total depth of catch	Total depth to bottom of outlet pipe	Depth to top of sediment	Depth of Sedimentation (D_{ST}, inches)	Percent Capacity Filled	Cleaning Required?
	Debris Filter	TPH Filter	(inches)	(Yes/No)	(Dc, inches)	(Di, inches)	(Ds, inches)	(DC-DS)	(DST/DC)	
CB#1	NA	NA	None	None	38	NA	36.5	1.5	#VALUE!	#VALUE!
CB#2	NA	NA	None	None	38	NA	38	0	#VALUE!	#VALUE!
CB#3	NA	NA	None	Packing Peanuts	32	NA	32	0	#VALUE!	#VALUE!
CB#4	NA	NA	None	Packing Peanuts	31	NA	30.5	0.5	#VALUE!	#VALUE!
CB#5	NA	NA	None	Packing Peanuts	32	NA	32	0	#VALUE!	#VALUE!
CB#6	NA	NA	None	Packing Peanuts	32	NA	32	0	#VALUE!	#VALUE!

NP = Not Present, all depth measurements taken from top of catch basin grate

Notes: Dry weather assessment

Stormwater Sample Collected from Outfall? (YES) / NO

	(yes)	(no)
Spill Kits		
All present and property stocked	X	
Chemicals storage area		
(clean, all containers labeled, no appreciable staining or noticeable spillage)	X	
Parking Lot and Drive Surfaces		
(surface free of cracks/sumping (low areas), high visible wear)	X	
(clean, no appreciable staining or noticeable spillage)	X	
Presence of Cracks		X
Presence of debris in drive area (may damage paved areas or catch basins)		X

If yes indicate problem areas on map

Miscellaneous observations:

FIELD SAMPLING DATA SHEET

EVREN NORTHWEST INC
environmental natural resource consultants

PO Box 80747
Portland, Oregon, 97280-1747
503-452-5561 Fax: 503-452-7669
Office: (503) 692-8118 Fax: (503) 885-9702

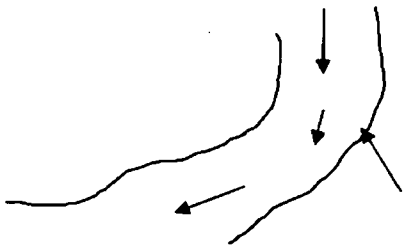
PROJECT NAME: FDP: S S21-07001-02 **LOCATION:** SP01

SITE ADDRESS: **LABEL CODE:**

WIND FROM:	N	NE	E	SE	S	(SW)	W	NW	LIGHT	(MEDIUM)	HEAVY
WEATHER:	SUNNY		CLOUDY		(RAIN)			?	TEMPERATURE:	°F 60.	°C

SAMPLE LOCATION DESCRIPTION

SP01 - MANHOLE
- WATER SL TURBID



§ METHODS: (A) Submersible Pump (B) Peristaltic Pump (C) Disposable Bailer (D) PVC/Teflon Bailer (E) Dedicated Bailer (F) Dedicated Pump (G) Other =

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: [√ if used]

Bottle Type	Date	Time	Method§	Amount & Volume mL		Preservative [circle]	Ice	Filter	pH	√
VOA Glass	/ /	:		3	40 ml	HCl	YES	NO		
Amber Glass	5/20/08	7:05	G	9	250, 500, (1L)	(None) (HCl) (H_2SO_4)	YES	NO		√
White Poly	5/20/08	7:05	G	1	250, (500) 1L	(HCl) None	YES	NO	NA	√
Yellow Poly	/ /	:			250, 500, 1L	H_2SO_4	YES	NO		
Green Poly	/ /	:			250, 500, 1L	NaOH	YES	NO		
Red Total Poly	5/20/08	7:05	G	1	(250) 500, 1L	(HNO_3)	YES	NO		√
Red Diss. Poly	/ /	:			250, 500, 1L	HNO_3	YES	YES		
	/ /	:			250, 500, 1L		YES			

White no acid, Yellow H2SO4, Red HNO3 — Total Bottles (include duplicate count):

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	VOA - Glass	(8010) (8010/8020) (8020) (8240) (8260) (BTEX) (TPH-G) (BTEX/TPH-G) OR [√] WA [ ]
	AMBER - Glass	(PAH) (TPH-HCID) (TPH-D) (TPH-418.1) (Oil &Grease) OR [√] WA [ ]
	WHITE - Poly	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO_3/CO_3) (Cl) (SO_4) (NO_3) (NO_2) (F)
	YELLOW - Poly	(COD) (TOC) (Total PO_4) (Total Keldahl Nitrogen) (NH4) (NO_3/NO_2)
	GREEN - Poly	(Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

WATER QUALITY DATA Purge Start Time: : ORP Pump/Bailer Inlet Depth:

Meas.	~~Method~~§	Purged (gal)	pH	E Cond (µS)	°F Temp (°C)	Other	Diss O_2 (mg/l)	Water Quality
4	TIME	.	.		.		.	
3		.	.		.		.	
2		.	.		.		.	
1		.	.		.		.	
0	0745	0.00	7.39	33	15.16	554	5.73	SL TURBID
[Casing]	[Select A-G]	[Cumulative Totals]			[Circle units]			[Clarity, Color]

SAMPLER: Lynn Green (PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET

EVREN NORTHWEST
environmental natural resource consultants
PO Box 80747
Portland, Oregon, 97280-1747
503-452-5561 Fax: 503-452-7669
Office: (503) 692-8118 Fax: (503) 885-9702

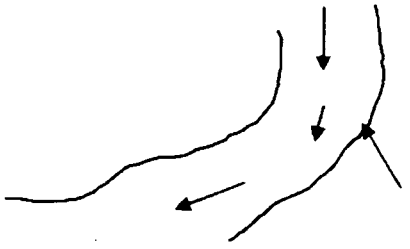
PROJECT NAME: Fred Devine Salvage **LOCATION:**

SITE ADDRESS: **LABEL CODE:**

WIND FROM:	N	NE	E	SE	S	SW	(W)	NW	(LIGHT)	MEDIUM	HEAVY
WEATHER:	SUNNY		CLOUDY		(RAIN)			?	**TEMPERATURE:**	°F .	°C

SAMPLE LOCATION DESCRIPTION

SP-1 - See Map
Sheen observed flowing into CB's 1, 2 + 4
Sheen observed on water in Sampling point
Silty turbid water from Gravel Area entering CB-1



§ METHODS: (A) Submersible Pump (B) Peristaltic Pump (C) Disposable Bailer (D) PVC/Teflon Bailer (E) Dedicated Bailer (F) Dedicated Pump (G) Other =

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: [√ if used]

Bottle Type	Date	Time	Method§	Amount & Volume mL		Preservative (circle)	Ice	Filter	pH	√
VOA Glass	/ /	:		3	40 ml	HCl	YES	NO		
Amber Glass	3/26/08	11 : 45		9	250, (500) (1L)	(None) (HCl) (H_2SO_4)	(YES)	(NO)		
White Poly	3/26/08	11 : 45		1	250, (500) 1L	None	(YES)	(NO)	NA	
Yellow Poly	/ /	:			250, 500, 1L	H_2SO_4	YES	NO		
Green Poly	/ /	:			250, 500, 1L	NaOH	YES	NO		
Red Total Poly	3/26/08	11 : 45		1	250, (500) 1L	HNO_3	(YES)	(NO)		
Red Diss. Poly	/ /	:			250, 500, 1L	HNO_3	YES	YES		
	/ /	:			250, 500, 1L		YES			

White no acid, Yellow H2SO4, Red HNO3 — Total Bottles (include duplicate count):

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	VOA - Glass	(8010) (8010/8020) (8020) (8240) (8260) (BTEX) (TPH-G) (BTEX/TPH-G) OR [ ] WA [ ]
	AMBER - Glass	(PAH) (TPH-HCID) (TPH-D) (TPH-418.1) (Oil &Grease) OR [ ] WA [ ]
	WHITE - Poly	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO_3/CO_3) (Cl) (SO_4) (NO_3) (NO_2) (F)
	YELLOW - Poly	(COD) (TOC) (Total PO_4) (Total Keldahl Nitrogen) (NH4) (NO_3/NO_2)
	GREEN - Poly	(Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

WATER QUALITY DATA Purge Start Time: : ORP Pump/Bailer Inlet Depth:

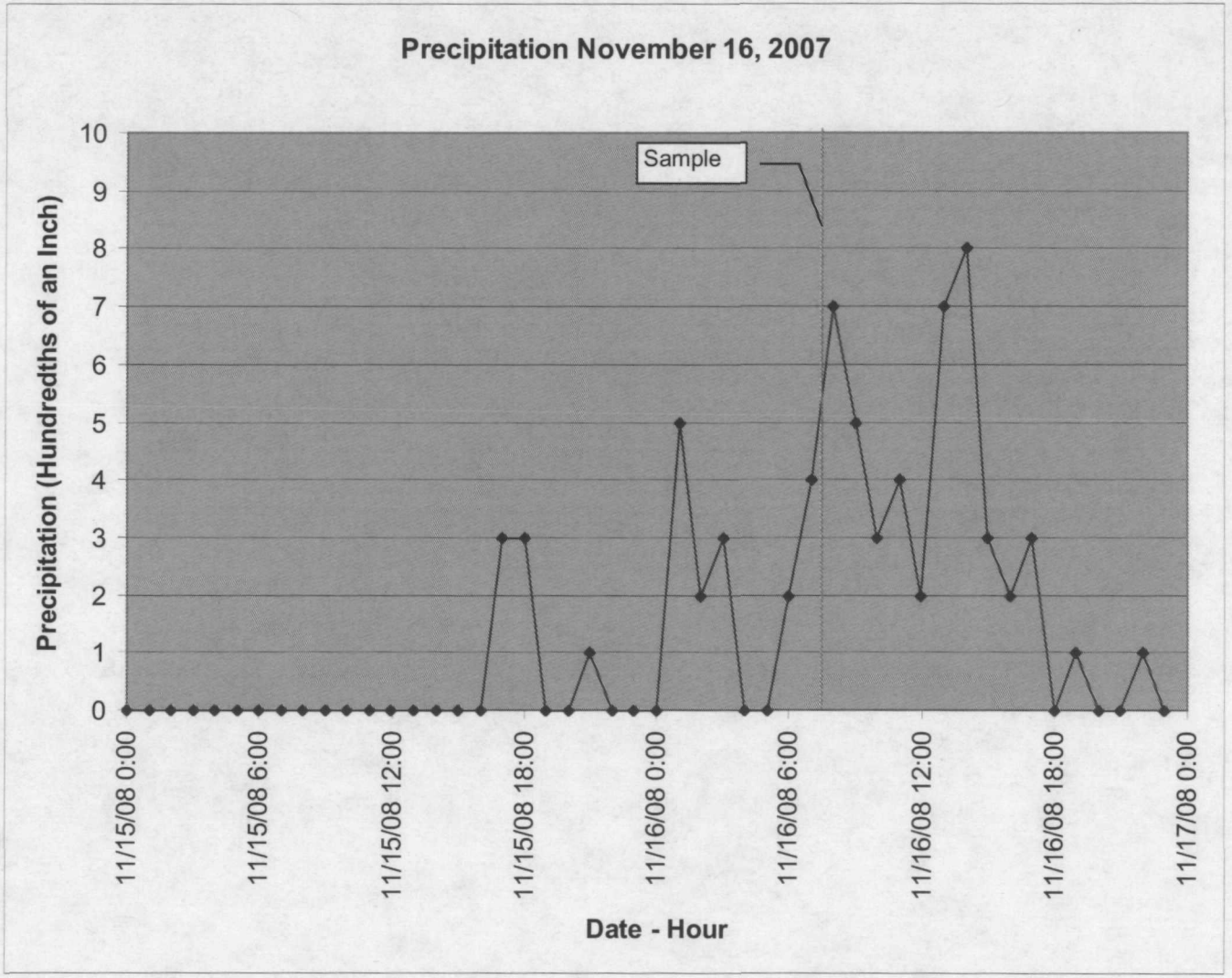
Meas.	~~Method~~ §	Purged (gal)	pH	E Cond (µS)	°F Temp (°C)	Other	Diss O_2 (mg/l)	Water Quality
4	Time	.	.		.		.	
3		.	.		.		.	
2		.	.		.		.	
1		.	7.42		.		.	
0	1145	0.00	[illegible]	145	6.54	22.1	7.98	Clear
	[Casing]	[Select A-G]	[Cumulative Totals]		[Circle units]			[Clarity, Color]

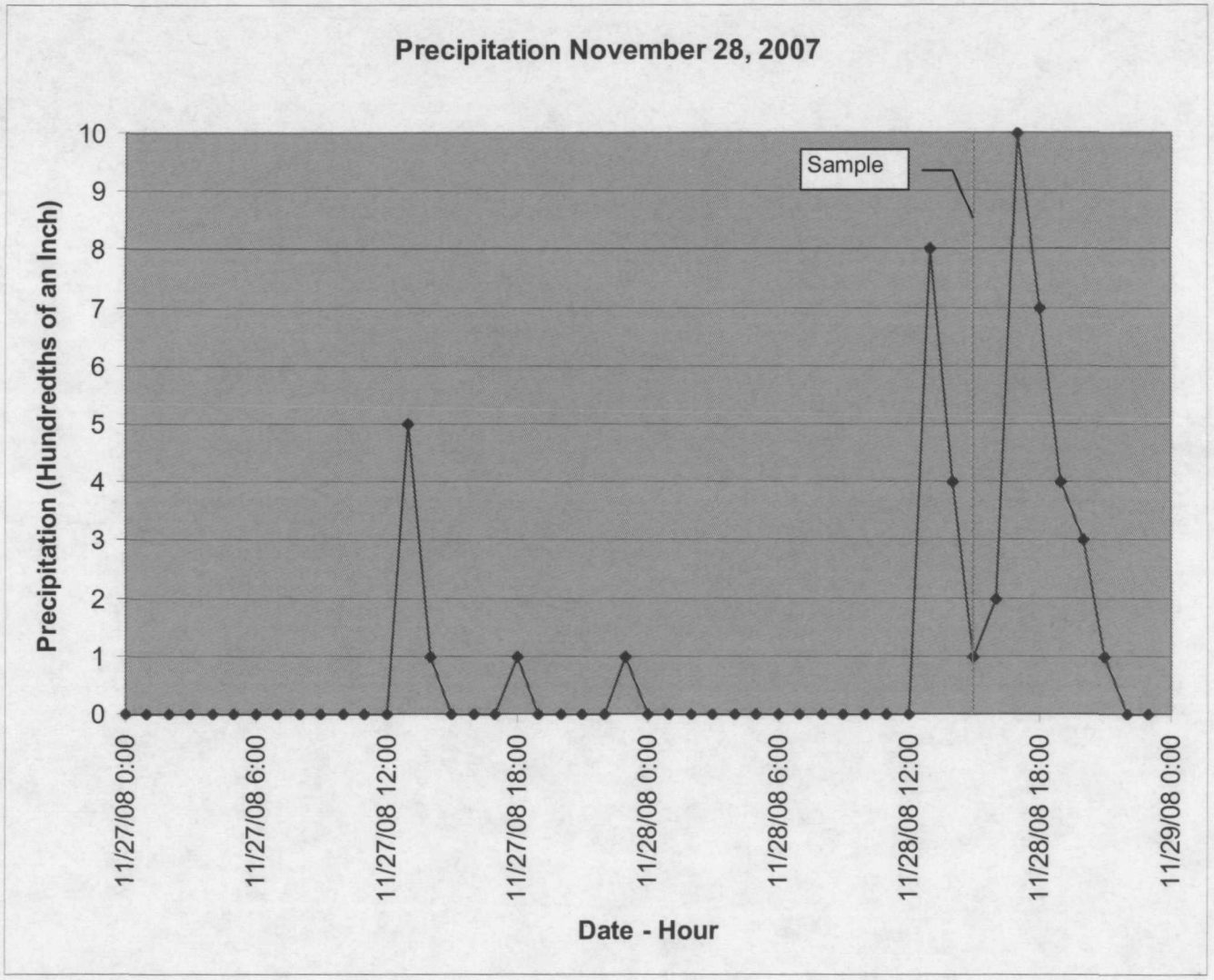
SAMPLER: Mike Krzeminski (PRINTED NAME) (SIGNATURE)

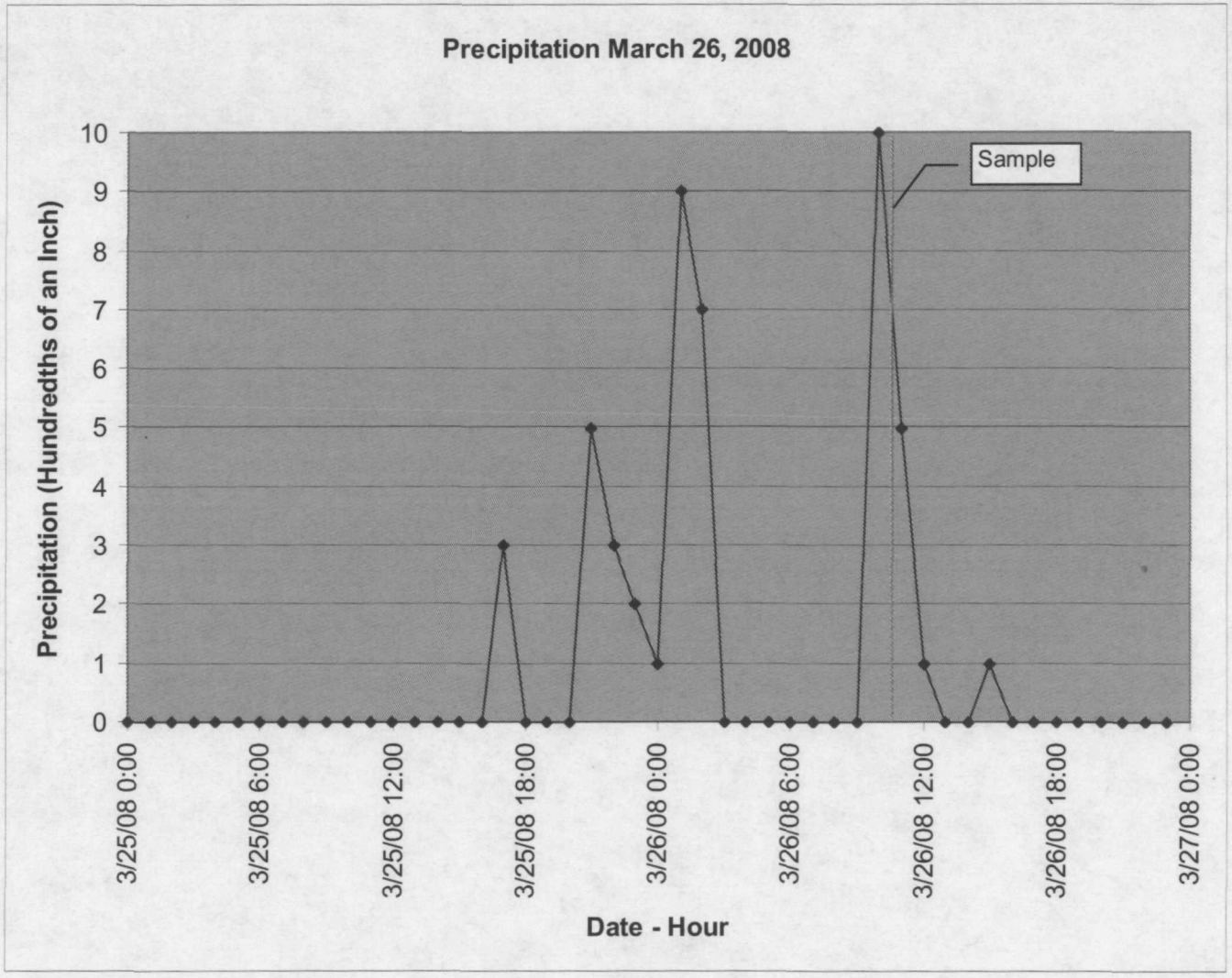
Sheen on Storm Water

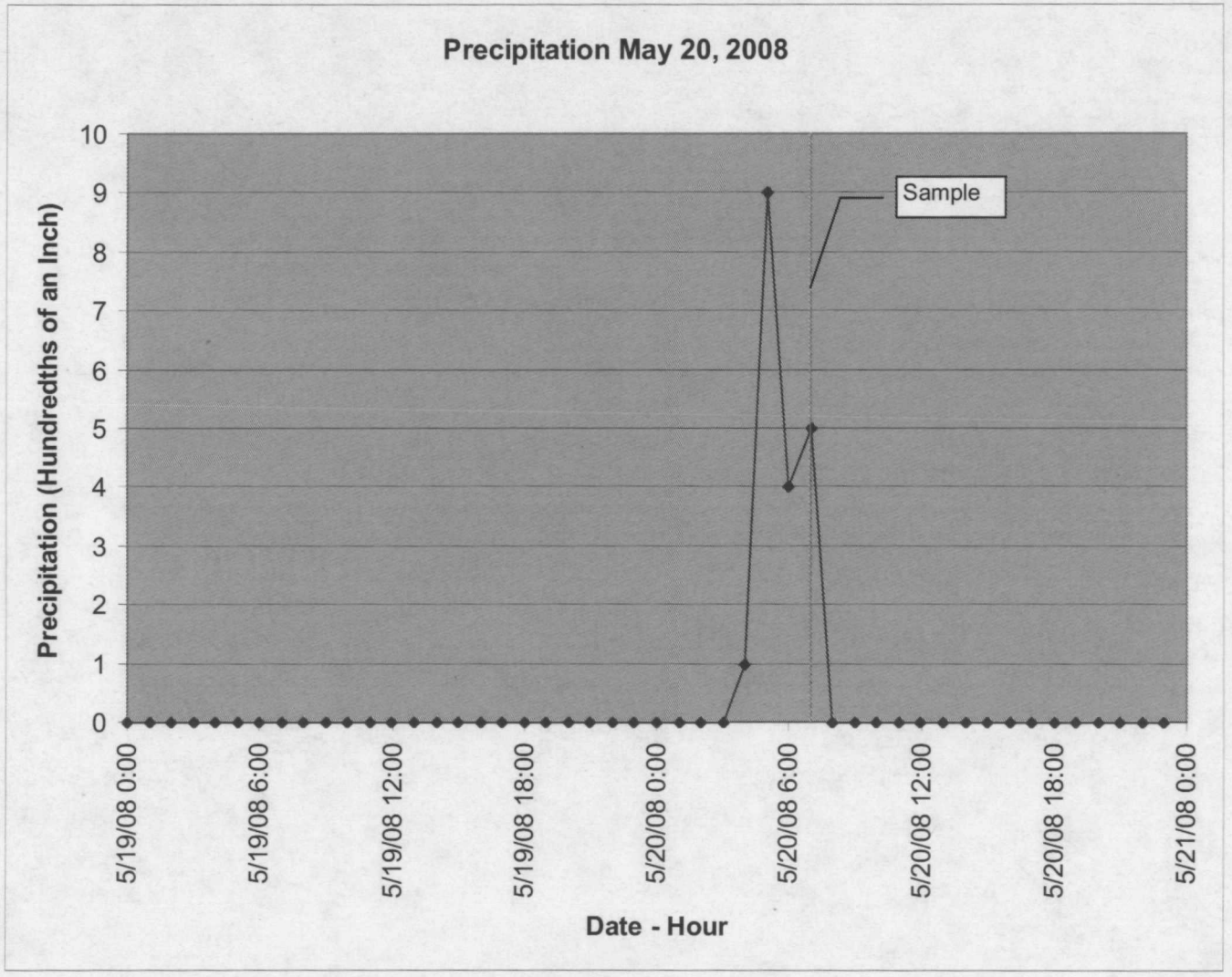
B

ATTACHMENT B PRECIPITATION HYDROGRAPHS


Precipitation November 16, 2007
Precipitation (Hundredths of an Inch)
10
9
8
7
6
5
4
3
2
1
0
Sample
11/15/08 0:00
11/15/08 6:00
11/15/08 12:00
11/15/08 18:00
11/16/08 0:00
11/16/08 6:00
11/16/08 12:00
11/16/08 18:00
11/17/08 0:00
Date - Hour


Precipitation November 28, 2007
Precipitation (Hundredths of an Inch)
10
9
8
7
6
5
4
3
2
1
0
Sample
11/27/08 0:00
11/27/08 6:00
11/27/08 12:00
11/27/08 18:00
11/28/08 0:00
11/28/08 6:00
11/28/08 12:00
11/28/08 18:00
11/29/08 0:00
Date - Hour


Precipitation March 26, 2008
Precipitation (Hundredths of an Inch)
10
9
8
7
6
5
4
3
2
1
0
Sample
3/25/08 0:00
3/25/08 6:00
3/25/08 12:00
3/25/08 18:00
3/26/08 0:00
3/26/08 6:00
3/26/08 12:00
3/26/08 18:00
3/27/08 0:00
Date - Hour


Precipitation May 20, 2008
Precipitation (Hundredths of an Inch)
10
9
8
7
6
5
4
3
2
1
0
Sample
5/19/08 0:00
5/19/08 6:00
5/19/08 12:00
5/19/08 18:00
5/20/08 0:00
5/20/08 6:00
5/20/08 12:00
5/20/08 18:00
5/21/08 0:00
Date - Hour

C

ATTACHMENT C LABORATORY ANALYTICAL RESULTS

803284

SAMPLE CHAIN OF CUSTODY

ME 03/27/08

B05/AIG

Project Manger:	Lynn Green; Mike Krzeminski
Company:	EVREN Northwest, Inc.
Address:	PO BOX 80747 Portland, OR 97280-1747
Phone:	(503) 452-5561
Fax:	(503) 452-7669
Email:	lynng@evren-nw.com; mikek@evren-nw.com

Samplers Signature:

Project Name/Number: Fred Divine Salvage

521-07001-01

Remarks:
Hi-res for all analyses

Page # 1 of 1

TURNAROUND TIME
☒ Standard (2 weeks)
☐ RUSH

SAMPLE ID	LAB ID	DATE	TIME	SAMPLE TYPE	# OF CONTAINERS	ANALYSES REQUESTED: TPH-HCID	TPH-GX	TPH-DX	BTEX	RBDM VOCS	VOCS (8260)	PAHS (SIM)	PCBS	METALS: Cd, Cr, Cu, Pb, Ni, Zn	RCRA METALS	SVOCS (8270)	TSS	Phthalate	Hardness	Oil and Grease	BOD5		NOTES
SP-1	01A-J	3/26/08	1145	Water	11			X				X	X	X		X	X	X					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029

Ph. (206) 285-8282
Fx. (206) 283-5044

Signature	Print Name	Company	Date	Time
Relinquished By:	Mike Krzeminski	ENW	3/26/2008	14:00
Received By:	Nhan Phan	FeBI	3/27/08	09:30
Relinquished By:				
Received By:				

Samples received at 4 °C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

June 10, 2008

Lynn Green, Project Manager
Evren Northwest, Inc.
PO Box 80747
Portland, OR 97280

Dear Mr. Green:

Included are the results from the testing of material submitted on May 22, 2008 from the 521-07001-02 FDD&S, F&BI 805228 project. There are 17 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Bradley T. Benson
Chemist

Enclosures
c: Neil Woller, Mike Krzeminski
ENW0610R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on May 22, 2008 by Friedman & Bruya, Inc. from the Evren Northwest, Inc. 521-07001-02 FDD&S, F&BI 805228 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Evren Northwest, Inc.
805228-01	0SP01-080520

All quality control requirements were acceptable.

Date of Report: 06/10/08
Date Received: 05/22/08
Project: 521-07001-02 FDD&S, F&BI 805228
Date Extracted: 05/23/08
Date Analyzed: 05/24/08

RESULTS FROM THE ANALYSIS OF THE WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 50-150)
0SP01-080520 805228-01	940	2,000	117
Method Blank	<50	<250	103

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	0SP01-080520	Client:	Evren Northwest, Inc.
Date Received:	05/22/08	Project:	521-07001-02, F&BI 805228
Date Extracted:	05/28/08	Lab ID:	805228-01
Date Analyzed:	05/30/08	Data File:	805228-01.009
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	hr

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	105	60	125
Indium	99	60	125
Holmium	105	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	98.7
Nickel	3.62
Copper	48.1
Zinc	395
Cadmium	0.86
Lead	14.9

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Evren Northwest, Inc.
Date Received:	NA	Project:	521-07001-02, F&BI 805228
Date Extracted:	05/28/08	Lab ID:	I8-195 mb
Date Analyzed:	05/30/08	Data File:	I8-195 mb.008
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	hr

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	102	60	125
Indium	102	60	125
Holmium	103	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	<1
Nickel	<1
Copper	<1
Zinc	<1
Cadmium	<0.2
Lead	<0.5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	0SP01-080520	Client:	Evren Northwest, Inc.
Date Received:	05/22/08	Project:	521-07001-02, F&BI 805228
Date Extracted:	05/27/08	Lab ID:	805228-01
Date Analyzed:	05/28/08	Data File:	052806.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	73	50	150
Benzo(a)anthracene-d12	86	50	129

Compounds:	Concentration ug/L (ppb)
Naphthalene	0.53
Acenaphthylene	0.070
Acenaphthene	<0.05
Fluorene	0.093
Phenanthrene	0.29
Anthracene	0.064
Fluoranthene	0.23
Pyrene	0.15
Benz(a)anthracene	0.082
Chrysene	0.18
Benzo(a)pyrene	0.056
Benzo(b)fluoranthene	0.13
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	0.056
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	0.060

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Evren Northwest, Inc.
Date Received:	NA	Project:	521-07001-02, F&BI 805228
Date Extracted:	05/27/08	Lab ID:	080812mb
Date Analyzed:	05/28/08	Data File:	052805.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	77	50	150
Benzo(a)anthracene-d12	81	50	129

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	<0.05
Anthracene	<0.05
Fluoranthene	<0.05
Pyrene	<0.05
Benz(a)anthracene	<0.05
Chrysene	<0.05
Benzo(a)pyrene	<0.05
Benzo(b)fluoranthene	<0.05
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	0SP01-080520	Client:	Evren Northwest, Inc.
Date Received:	05/22/08	Project:	521-07001-02, F&BI 805228
Date Extracted:	05/27/08	Lab ID:	805228-01
Date Analyzed:	05/28/08	Data File:	052806.D
Matrix:	Water	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	61	27	76
Phenol-d6	40	13	58
Nitrobenzene-d5	94	55	115
2-Fluorobiphenyl	91	51	113
2,4,6-Tribromophenol	97	28	107
Terphenyl-d14	87	45	119

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Phenol	<5	3-Nitroaniline	<1.5
Bis(2-chloroethyl) ether	<0.5	Acenaphthene	<0.5
2-Chlorophenol	<5	2,4-Dinitrophenol	<15
1,3-Dichlorobenzene	<0.5	Dibenzofuran	<0.5
1,4-Dichlorobenzene	<0.5	2,4-Dinitrotoluene	<0.5
1,2-Dichlorobenzene	<0.5	4-Nitrophenol	<5
Benzyl alcohol	<0.5	Diethyl phthalate	<0.5
Bis(2-chloroisopropyl) ether	<0.5	Fluorene	<0.5
2-Methylphenol	<5	4-Chlorophenyl phenyl ether	<0.5
Hexachloroethane	<0.5	N-Nitrosodiphenylamine	<0.5
N-Nitroso-di-n-propylamine	<0.5	4-Nitroaniline	<5
4-Methylphenol	<5	4,6-Dinitro-2-methylphenol	<15
Nitrobenzene	<0.5	4-Bromophenyl phenyl ether	<0.5
Isophorone	<0.5	Hexachlorobenzene	<0.5
2-Nitrophenol	<5	Pentachlorophenol	<5
2,4-Dimethylphenol	<5	Phenanthrene	<0.5
Benzoic acid	<50	Anthracene	<0.5
Bis(2-chloroethoxy)methane	<0.5	Carbazole	<0.5
2,4-Dichlorophenol	<5	Di-n-butyl phthalate	<0.5
1,2,4-Trichlorobenzene	<0.5	Fluoranthene	<0.5
Naphthalene	<0.5	Pyrene	<0.5
Hexachlorobutadiene	<0.5	Benzyl butyl phthalate	<0.5
4-Chloroaniline	<1.5	Benz(a)anthracene	<0.5
4-Chloro-3-methylphenol	<5	Chrysene	<0.5
2-Methylnaphthalene	<0.5	Bis(2-ethylhexyl) phthalate	3.1 fbs
Hexachlorocyclopentadiene	<1.5	Di-n-octyl phthalate	<0.5
2,4,6-Trichlorophenol	<5	Benzo(a)pyrene	<0.5
2,4,5-Trichlorophenol	<5	Benzo(b)fluoranthene	<0.5
2-Chloronaphthalene	<0.5	Benzo(k)fluoranthene	<0.5
2-Nitroaniline	<0.5	Indeno(1,2,3-cd)pyrene	<0.5
Dimethyl phthalate	<0.5	Dibenz(a,h)anthracene	<0.5
Acenaphthylene	<0.5	Benzo(g,h,i)perylene	<0.5
2,6-Dinitrotoluene	<0.5		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	Method Blank	Client:	Evren Northwest, Inc.
Date Received:	05/22/08	Project:	521-07001-02, F&BI 805228
Date Extracted:	05/27/08	Lab ID:	080812mb
Date Analyzed:	05/28/08	Data File:	052805.D
Matrix:	Water	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	56	27	76
Phenol-d6	39	13	58
Nitrobenzene-d5	93	55	115
2-Fluorobiphenyl	85	51	113
2,4,6-Tribromophenol	81	28	107
Terphenyl-d14	77	45	119

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Phenol	<5	3-Nitroaniline	<1.5
Bis(2-chloroethyl) ether	<0.5	Acenaphthene	<0.5
2-Chlorophenol	<5	2,4-Dinitrophenol	<15
1,3-Dichlorobenzene	<0.5	Dibenzofuran	<0.5
1,4-Dichlorobenzene	<0.5	2,4-Dinitrotoluene	<0.5
1,2-Dichlorobenzene	<0.5	4-Nitrophenol	<5
Benzyl alcohol	<0.5	Diethyl phthalate	<0.5
Bis(2-chloroisopropyl) ether	<0.5	Fluorene	<0.5
2-Methylphenol	<5	4-Chlorophenyl phenyl ether	<0.5
Hexachloroethane	<0.5	N-Nitrosodiphenylamine	<0.5
N-Nitroso-di-n-propylamine	<0.5	4-Nitroaniline	<5
4-Methylphenol	<5	4,6-Dinitro-2-methylphenol	<15
Nitrobenzene	<0.5	4-Bromophenyl phenyl ether	<0.5
Isophorone	<0.5	Hexachlorobenzene	<0.5
2-Nitrophenol	<5	Pentachlorophenol	<5
2,4-Dimethylphenol	<5	Phenanthrene	<0.5
Benzoic acid	<50	Anthracene	<0.5
Bis(2-chloroethoxy)methane	<0.5	Carbazole	<0.5
2,4-Dichlorophenol	<5	Di-n-butyl phthalate	<0.5
1,2,4-Trichlorobenzene	<0.5	Fluoranthene	<0.5
Naphthalene	<0.5	Pyrene	<0.5
Hexachlorobutadiene	<0.5	Benzyl butyl phthalate	<0.5
4-Chloroaniline	<1.5	Benz(a)anthracene	<0.5
4-Chloro-3-methylphenol	<5	Chrysene	<0.5
2-Methylnaphthalene	<0.5	Bis(2-ethylhexyl) phthalate	0.26
Hexachlorocyclopentadiene	<1.5	Di-n-octyl phthalate	<0.5
2,4,6-Trichlorophenol	<5	Benzo(a)pyrene	<0.5
2,4,5-Trichlorophenol	<5	Benzo(b)fluoranthene	<0.5
2-Chloronaphthalene	<0.5	Benzo(k)fluoranthene	<0.5
2-Nitroaniline	<0.5	Indeno(1,2,3-cd)pyrene	<0.5
Dimethyl phthalate	<0.5	Dibenz(a,h)anthracene	<0.5
Acenaphthylene	<0.5	Benzo(g,h,i)perylene	<0.5
2,6-Dinitrotoluene	<0.5		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/10/08
Date Received: 05/22/08
Project: 521-07001-02 FDD&S, F&BI 805228
Date Analyzed: 05/27/08

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL SUSPENDED SOLIDS BY METHOD 2540D

Results Reported as mg/L (ppm)

Sample ID Laboratory ID	Total Suspended Solids
0SP01-080520 805228-01	99
Method Blank	<10

Date of Report: 06/10/08
Date Received: 05/22/08
Project: 521-07001-02 FDD&S, F&BI 805228
Date Extracted: 05/27/08
Date Analyzed: 05/28/08

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR PCBs AS AROCLORS USING EPA METHOD 8082

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Aroclor 1221	1232	1016	1242	1248	1254	1260	1262	Surrogate (% Rec.) (Limit 61-132)
0SP01-080520 805228-01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	124
Method Blank	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	88

Date of Report: 06/10/08
Date Received: 05/22/08
Project: 521-07001-02 FDD&S, F&BI 805228

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	110	118	70-130	7

Date of Report: 06/10/08
Date Received: 05/22/08
Project: 521-07001-02 FDD&S, F&BI 805228

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 805213-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	ug/L (ppb)	<1	<1	nm	0-20
Nickel	ug/L (ppb)	<1	<1	nm	0-20
Copper	ug/L (ppb)	4.24	4.38	3	0-20
Zinc	ug/L (ppb)	142	145	2	0-20
Cadmium	ug/L (ppb)	<0.2	<0.2	nm	0-20
Lead	ug/L (ppb)	0.57	0.60	5	0-20

Laboratory Code: 805213-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	ug/L (ppb)	20	<1	100	50-150
Nickel	ug/L (ppb)	20	<1	96	50-150
Copper	ug/L (ppb)	20	4.24	100 b	50-150
Zinc	ug/L (ppb)	50	142	97 b	50-150
Cadmium	ug/L (ppb)	5	<0.2	107	50-150
Lead	ug/L (ppb)	10	0.57	105	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	ug/L (ppb)	20	102	70-130
Nickel	ug/L (ppb)	20	102	70-130
Copper	ug/L (ppb)	20	105	70-130
Zinc	ug/L (ppb)	50	91	70-130
Cadmium	ug/L (ppb)	5	106	70-130
Lead	ug/L (ppb)	10	103	70-130

Date of Report: 06/10/08
Date Received: 05/22/08
Project: 521-07001-02 FDD&S, F&BI 805228

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	5	78	81	68-101	4
Acenaphthylene	ug/L (ppb)	5	79	81	70-109	2
Acenaphthene	ug/L (ppb)	5	80	83	69-104	4
Fluorene	ug/L (ppb)	5	79	86	68-111	8
Phenanthrene	ug/L (ppb)	5	77	79	66-106	3
Anthracene	ug/L (ppb)	5	75	78	67-112	4
Fluoranthene	ug/L (ppb)	5	72	77	69-116	7
Pyrene	ug/L (ppb)	5	71	76	68-115	7
Benz(a)anthracene	ug/L (ppb)	5	75	77	65-102	3
Chrysene	ug/L (ppb)	5	79	80	66-103	1
Benzo(b)fluoranthene	ug/L (ppb)	5	85	88	70-117	3
Benzo(k)fluoranthene	ug/L (ppb)	5	80	88	64-116	10
Benzo(a)pyrene	ug/L (ppb)	5	81	87	68-116	7
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	87	80	63-122	8
Dibenz(a,h)anthracene	ug/L (ppb)	5	85	83	66-116	2
Benzo(g,h,i)perylene	ug/L (ppb)	5	82	81	66-114	1

Date of Report: 06/10/08
Date Received: 05/22/08
Project: 521-07001-02 FDD&S, F&BI 805228

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Phenol	ug/L (ppb)	75	38	44	18-54	15
2-Chlorophenol	ug/L (ppb)	75	73	80	47-103	9
1,4-Dichlorobenzene	ug/L (ppb)	50	76	81	47-105	6
2-Methylphenol	ug/L (ppb)	50	71	79	43-93	11
N-Nitroso-di-n-propylamine	ug/L (ppb)	50	84	89	49-115	6
4-Methylphenol	ug/L (ppb)	50	65	72	35-86	10
2-Nitrophenol	ug/L (ppb)	50	78	83	56-104	6
2,4-Dimethylphenol	ug/L (ppb)	50	66	70	27-101	6
Benzoic acid	ug/L (ppb)	75	26	27	10-53	4
2,4-Dichlorophenol	ug/L (ppb)	50	81	87	52-108	7
1,2,4-Trichlorobenzene	ug/L (ppb)	50	81	87	49-108	7
Naphthalene	ug/L (ppb)	50	77	82	48-117	6
4-Chloro-3-methylphenol	ug/L (ppb)	50	79	85	48-110	7
Hexachlorocyclopentadiene	ug/L (ppb)	50	74	79	16-117	7
2,4,6-Trichlorophenol	ug/L (ppb)	50	77	84	41-120	9
2,4,5-Trichlorophenol	ug/L (ppb)	50	78	84	54-118	7
Acenaphthene	ug/L (ppb)	75	73	78	23-130	7
2,4-Dinitrophenol	ug/L (ppb)	50	87	93	38-135	7
2,4-Dinitrotoluene	ug/L (ppb)	50	86	93	49-121	8
4-Nitrophenol	ug/L (ppb)	75	42	50	16-64	17
4,6-Dinitro-2-methylphenol	ug/L (ppb)	50	97	106	32-148	9
Hexachlorobenzene	ug/L (ppb)	50	74	80	40-120	8
Pentachlorophenol	ug/L (ppb)	50	92	100	24-120	8
Pyrene	ug/L (ppb)	50	69	75	44-119	8
Benzo(a)pyrene	ug/L (ppb)	50	77	84	47-125	9

Date of Report: 06/10/08
Date Received: 05/22/08
Project: 521-07001-02 FDD&S, F&BI 805228

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL SUSPENDED SOLIDS BY METHOD 2540D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
TSS	mg/L	50	109	96	67-128	13

Date of Report: 06/10/08
Date Received: 05/22/08
Project: 521-07001-02 FDD&S, F&BI 805228

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	% Recovery LCS	% Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	ug/L (ppb)	2.0	96	106	52-135	10
Aroclor 1260	ug/L (ppb)	2.0	93	100	60-128	7

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probablility.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

fbs - The analyte indicated was found in the blank. A small percentage of the material present may be due to laboratory contamination.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

Friedman + Bruya, Inc. 805228 ME-05-22-08 B05/A14

Environmental Services Laboratory, Inc

CHAIN OF CUSTODY

17460 SW Upper Boones Ferry Road • Suite 270 • Portland, OR 97224 • (503) 670-8520 • FAX (503) 670-9243

Company: Ewen NW | Project Manager: Ryan Green | LABORATORY #

Address: PO Box 80747

Phone: 503-452-5561 Fax: 452-21669

SAMPLE DISPOSAL INSTRUCTIONS

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	NWTPH-HCID	NWTPH-GX	NWTPH-DX	8020M - BETX only	8270 SIMS PAHs	Halogenated VOCs/GCMS	Aromatic VOCs/GCMS	8260 GCMS Volatiles	8270 GCMS Semivolatiles	8081 GC Pesticides/PCBs	8081m PCBs only	RCRA Metals (8)	Priority Pollutant Metals (13)	Metals: Cd, Cr, Pb	TCLP Metals (8)	TCLP Volatiles 8260 ZH-EXT	TCLP Semivolatiles 8270	TSS	Zinc	# OF CONTAINERS
⇒SB01-050520	5/20/08		WATER	01A-K			X						X		X			X				X	X	

PROJECT INFORMATION

PROJECT NUMBER: 521-07001-02

PROJECT NAME: FDDIS

PURCHASE ORDER NUMBER: 521-07001

ONGOING PROJECT? YES X NO ☐

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS

COC SEALS INTACT? Y / N / NA

RECEIVED INTACT? Y / N

RECEIVED COLD? Y / N

PRIOR AUTHORIZATION REQUIRED FOR RUSH PROJECTS

TAT (NORMAL) (2 WKS) (RUSH) ☐ 24 HR ☐ 48 HRS ☐ 72 HRS ☐ 1 WK

GREATER THAN 24 HR. NOTICE? YES X NO ☐ (LAB USE ONLY)

SPECIAL INSTRUCTIONS:

Special List 00 - High RDLs.

Sampled by:

Received via:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
SIGNATURE: Time 0600	SIGNATURE: Time	SIGNATURE: Time
Printed Name: Date 21/5/08	Printed Name: Date	Printed Name: Date
Company: EWN	Company:	Company:
RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time 08:10	Signature: Time	Signature: Time
Printed Name: Nick Schroeder Date 21/5/08	Printed Name: Date	Printed Name: Date
Company:	Company: FBI	ESL Inc.:

DISTRIBUTION: White, Canary - ESL, Pink - Originator

Samples received at 5 °C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

April 8, 2008

Lynn Green, Project Manager
Evren Northwest, Inc.
PO Box 80747
Portland, OR 97280

Dear Mr. Green:

Included are the results from the testing of material submitted on March 27, 2008 from the Fred Divine Salvage 521-07001-01, F&BI 803284 project. There are 17 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Bradley T. Benson
Chemist

Enclosures
c: Neil Woller, Mike Krzeminski
ENW0408R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 27, 2008 by Friedman & Bruya, Inc. from the Evren Northwest, Inc. Fred Divine Salvage 521-07001-01, F&BI 803284 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Evren Northwest, Inc.
803284-01	SP-1

The 8270C bis(2-ethylhexyl) phthalate detection in SP-1 was also detected in the method blank. The internal standard associated with the bis(2-ethylhexyl) phthalate detections is outside of the acceptance criteria. The data is flagged accordingly. All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/08/08
Date Received: 03/27/08
Project: Fred Divine Salvage 521-07001-01, F&BI 803284
Date Extracted: 03/27/08
Date Analyzed: 03/27/08

RESULTS FROM THE ANALYSIS OF THE WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND RESIDUAL RANGE USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Residual Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 50-150)
SP-1 803284-01	360 x	1,200	83
Method Blank	<50	<250	73

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	SP-1	Client:	Evren Northwest, Inc.
Date Received:	03/27/08	Project:	521-07001-01, F&BI 803284
Date Extracted:	03/31/08	Lab ID:	803284-01
Date Analyzed:	03/31/08	Data File:	803284-01.111
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	hr

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	63	60	125
Indium	71	60	125
Holmium	82	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	3.13
Nickel	2.77
Copper	30.8
Zinc	299
Cadmium	0.80
Lead	24.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Evren Northwest, Inc.
Date Received:	NA	Project:	521-07001-01, F&BI 803284
Date Extracted:	03/31/08	Lab ID:	I8-104 mb
Date Analyzed:	03/31/08	Data File:	I8-104 mb.099
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	hr

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	62	60	125
Indium	71	60	125
Holmium	81	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	<1
Nickel	<1
Copper	<1
Zinc	<1
Cadmium	<0.1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	SP-1	Client:	Evren Northwest, Inc.
Date Received:	03/27/08	Project:	521-07001-01, F&BI 803284
Date Extracted:	03/27/08	Lab ID:	803284-01
Date Analyzed:	03/28/08	Data File:	032806.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	81	50	150
Benzo(a)anthracene-d12	91	50	129

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	0.13
Anthracene	<0.05
Fluoranthene	0.24
Pyrene	0.18
Benz(a)anthracene	0.062
Chrysene	0.18
Benzo(a)pyrene	0.067
Benzo(b)fluoranthene	0.16
Benzo(k)fluoranthene	0.057
Indeno(1,2,3-cd)pyrene	0.080
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	0.091

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Evren Northwest, Inc.
Date Received:	NA	Project:	521-07001-01, F&BI 803284
Date Extracted:	03/27/08	Lab ID:	080479mb2
Date Analyzed:	03/28/08	Data File:	032804.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	80	50	150
Benzo(a)anthracene-d12	89	50	129

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	<0.05
Anthracene	<0.05
Fluoranthene	<0.05
Pyrene	<0.05
Benz(a)anthracene	<0.05
Chrysene	<0.05
Benzo(a)pyrene	<0.05
Benzo(b)fluoranthene	<0.05
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	SP-1	Client:	Evren Northwest, Inc.
Date Received:	03/27/08	Project:	521-07001-01, F&BI 803284
Date Extracted:	03/31/08	Lab ID:	803284-01
Date Analyzed:	04/01/08	Data File:	040111.D
Matrix:	Water	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	54	27	76
Phenol-d6	39	13	58
Nitrobenzene-d5	89	55	115
2-Fluorobiphenyl	90	51	113
2,4,6-Tribromophenol	117 vo	28	107
Terphenyl-d14	95	45	119

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Phenol	<5	3-Nitroaniline	<1.5
Bis(2-chloroethyl) ether	<0.5	Acenaphthene	<0.5
2-Chlorophenol	<5	2,4-Dinitrophenol	<15
1,3-Dichlorobenzene	<0.5	Dibenzofuran	<0.5
1,4-Dichlorobenzene	<0.5	2,4-Dinitrotoluene	<0.5
1,2-Dichlorobenzene	<0.5	4-Nitrophenol	<5
Benzyl alcohol	<0.5	Diethyl phthalate	<0.5
Bis(2-chloroisopropyl) ether	<0.5	Fluorene	<0.5
2-Methylphenol	<5	4-Chlorophenyl phenyl ether	<0.5
Hexachloroethane	<0.5	N-Nitrosodiphenylamine	<0.5
N-Nitroso-di-n-propylamine	<0.5	4-Nitroaniline	<5
4-Methylphenol	<5	4,6-Dinitro-2-methylphenol	<15
Nitrobenzene	<0.5	4-Bromophenyl phenyl ether	<0.5
Isophorone	<0.5	Hexachlorobenzene	<0.5
2-Nitrophenol	<5	Pentachlorophenol	<5
2,4-Dimethylphenol	<5	Phenanthrene	<0.5
Benzoic acid	<50	Anthracene	<0.5
Bis(2-chloroethoxy)methane	<0.5	Carbazole	<0.5
2,4-Dichlorophenol	<5	Di-n-butyl phthalate	<0.5
1,2,4-Trichlorobenzene	<0.5	Fluoranthene	<0.5
Naphthalene	<0.5	Pyrene	<0.5
Hexachlorobutadiene	<0.5	Benzyl butyl phthalate	<0.5
4-Chloroaniline	<1.5	Benz(a)anthracene	<0.5
4-Chloro-3-methylphenol	<5	Chrysene	<0.5
2-Methylnaphthalene	<0.5	Bis(2-ethylhexyl) phthalate	3.1 J, fb
Hexachlorocyclopentadiene	<1.5	Di-n-octyl phthalate	<0.5
2,4,6-Trichlorophenol	<5	Benzo(a)pyrene	<0.5
2,4,5-Trichlorophenol	<5	Benzo(b)fluoranthene	<0.5
2-Chloronaphthalene	<0.5	Benzo(k)fluoranthene	<0.5
2-Nitroaniline	<0.5	Indeno(1,2,3-cd)pyrene	<0.5
Dimethyl phthalate	<0.5	Dibenz(a,h)anthracene	<0.5
Acenaphthylene	<0.5	Benzo(g,h,i)perylene	<0.5
2,6-Dinitrotoluene	<0.5		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	Method Blank	Client:	Evren Northwest, Inc.
Date Received:	NA	Project:	521-07001-01, F&BI 803284
Date Extracted:	03/31/08	Lab ID:	080499mb
Date Analyzed:	04/01/08	Data File:	040106.D
Matrix:	Water	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	54	27	76
Phenol-d6	38	13	58
Nitrobenzene-d5	89	55	115
2-Fluorobiphenyl	86	51	113
2,4,6-Tribromophenol	99	28	107
Terphenyl-d14	94	45	119

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Phenol	<10	3-Nitroaniline	<3
Bis(2-chloroethyl) ether	<1	Acenaphthene	<1
2-Chlorophenol	<10	2,4-Dinitrophenol	<30
1,3-Dichlorobenzene	<1	Dibenzofuran	<1
1,4-Dichlorobenzene	<1	2,4-Dinitrotoluene	<1
1,2-Dichlorobenzene	<1	4-Nitrophenol	<10
Benzyl alcohol	<1	Diethyl phthalate	<1
Bis(2-chloroisopropyl) ether	<1	Fluorene	<1
2-Methylphenol	<10	4-Chlorophenyl phenyl ether	<1
Hexachloroethane	<1	N-Nitrosodiphenylamine	<1
N-Nitroso-di-n-propylamine	<1	4-Nitroaniline	<10
4-Methylphenol	<10	4,6-Dinitro-2-methylphenol	<30
Nitrobenzene	<1	4-Bromophenyl phenyl ether	<1
Isophorone	<1	Hexachlorobenzene	<1
2-Nitrophenol	<10	Pentachlorophenol	<10
2,4-Dimethylphenol	<10	Phenanthrene	<1
Benzoic acid	<100	Anthracene	<1
Bis(2-chloroethoxy)methane	<1	Carbazole	<1
2,4-Dichlorophenol	<10	Di-n-butyl phthalate	<1
1,2,4-Trichlorobenzene	<1	Fluoranthene	<1
Naphthalene	<1	Pyrene	<1
Hexachlorobutadiene	<1	Benzyl butyl phthalate	<1
4-Chloroaniline	<3	Benz(a)anthracene	<1
4-Chloro-3-methylphenol	<10	Chrysene	<1
2-Methylnaphthalene	<1	Bis(2-ethylhexyl) phthalate	0.58 J
Hexachlorocyclopentadiene	<3	Di-n-octyl phthalate	<1
2,4,6-Trichlorophenol	<10	Benzo(a)pyrene	<1
2,4,5-Trichlorophenol	<10	Benzo(b)fluoranthene	<1
2-Chloronaphthalene	<1	Benzo(k)fluoranthene	<1
2-Nitroaniline	<1	Indeno(1,2,3-cd)pyrene	<1
Dimethyl phthalate	<1	Dibenz(a,h)anthracene	<1
Acenaphthylene	<1	Benzo(g,h,i)perylene	<1
2,6-Dinitrotoluene	<1		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/08/08
Date Received: 03/27/08
Project: Fred Divine Salvage 521-07001-01, F&BI 803284
Date Analyzed: 04/02/08

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL SUSPENDED SOLIDS BY METHOD 2540D

Results Reported as mg/L (ppm)

Sample ID Laboratory ID	Total Suspended Solids
SP-1 803284-01	68.9
Method Blank	<10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/08/08
Date Received: 03/27/08
Project: Fred Divine Salvage 521-07001-01, F&BI 803284
Date Analyzed: 03/28/08

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR PCBs AS AROCLORS USING EPA METHOD 8082

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Aroclor 1221	1232	1016	1242	1248	1254	1260	1262	Surrogate (% Rec.) (Limit 61-132)
SP-1 803284-01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	93
Method Blank	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	82

Date of Report: 04/08/08
Date Received: 03/27/08
Project: Fred Divine Salvage 521-07001-01, F&BI 803284

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	97	92	70-130	5

Date of Report: 04/08/08
Date Received: 03/27/08
Project: Fred Divine Salvage 521-07001-01, F&BI 803284

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 803313-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	ug/L (ppb)	1.06	1.06	0	0-20
Nickel	ug/L (ppb)	<1	<1	nm	0-20
Copper	ug/L (ppb)	2.50	2.61	4	0-20
Zinc	ug/L (ppb)	27.8	28.6	3	0-20
Cadmium	ug/L (ppb)	<0.1	<0.1	nm	0-20
Lead	ug/L (ppb)	5.82	6.07	4	0-20

Laboratory Code: 803313-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	ug/L (ppb)	20	1.06	84	50-150
Nickel	ug/L (ppb)	20	<1	86	50-150
Copper	ug/L (ppb)	20	2.50	87	50-150
Zinc	ug/L (ppb)	50	27.8	94 b	50-150
Cadmium	ug/L (ppb)	5	<0.1	109	50-150
Lead	ug/L (ppb)	10	5.82	98 b	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	ug/L (ppb)	20	91	70-130
Nickel	ug/L (ppb)	20	91	70-130
Copper	ug/L (ppb)	20	91	70-130
Zinc	ug/L (ppb)	50	100	70-130
Cadmium	ug/L (ppb)	5	109	70-130
Lead	ug/L (ppb)	10	104	70-130

Date of Report: 04/08/08
Date Received: 03/27/08
Project: Fred Divine Salvage 521-07001-01, F&BI 803284

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	5	88	88	68-101	0
Acenaphthylene	ug/L (ppb)	5	93	94	70-109	1
Acenaphthene	ug/L (ppb)	5	93	93	69-104	0
Fluorene	ug/L (ppb)	5	90	91	68-111	1
Phenanthrene	ug/L (ppb)	5	88	90	66-106	2
Anthracene	ug/L (ppb)	5	85	88	67-112	3
Fluoranthene	ug/L (ppb)	5	89	95	69-116	7
Pyrene	ug/L (ppb)	5	89	95	68-115	7
Benz(a)anthracene	ug/L (ppb)	5	87	88	65-102	1
Chrysene	ug/L (ppb)	5	90	92	66-103	2
Benzo(b)fluoranthene	ug/L (ppb)	5	96	106	70-117	10
Benzo(k)fluoranthene	ug/L (ppb)	5	97	102	64-116	5
Benzo(a)pyrene	ug/L (ppb)	5	96	100	68-116	4
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	103	106	63-122	3
Dibenz(a,h)anthracene	ug/L (ppb)	5	100	103	66-116	3
Benzo(g,h,i)perylene	ug/L (ppb)	5	97	100	66-114	3

Date of Report: 04/08/08
Date Received: 03/27/08
Project: Fred Divine Salvage 521-07001-01, F&BI 803284

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Phenol	ug/L (ppb)	75	38	42	18-54	10
2-Chlorophenol	ug/L (ppb)	75	69	76	47-103	10
1,4-Dichlorobenzene	ug/L (ppb)	50	78	79	47-105	1
2-Methylphenol	ug/L (ppb)	50	68	80	43-93	16
N-Nitroso-di-n-propylamine	ug/L (ppb)	50	85	94	49-115	10
4-Methylphenol	ug/L (ppb)	50	56	70	35-86	22 vo
2-Nitrophenol	ug/L (ppb)	50	81	84	56-104	4
2,4-Dimethylphenol	ug/L (ppb)	50	71	80	27-101	12
Benzoic acid	ug/L (ppb)	75	20	18	10-53	11
2,4-Dichlorophenol	ug/L (ppb)	50	85	90	52-108	6
1,2,4-Trichlorobenzene	ug/L (ppb)	50	82	84	49-108	2
Naphthalene	ug/L (ppb)	50	79	81	48-117	2
4-Chloro-3-methylphenol	ug/L (ppb)	50	79	87	48-110	10
Hexachlorocyclopentadiene	ug/L (ppb)	50	71	72	16-117	1
2,4,6-Trichlorophenol	ug/L (ppb)	50	84	88	41-120	5
2,4,5-Trichlorophenol	ug/L (ppb)	50	87	92	54-118	6
Acenaphthene	ug/L (ppb)	75	81	82	23-130	1
2,4-Dinitrophenol	ug/L (ppb)	50	93	101	38-135	8
2,4-Dinitrotoluene	ug/L (ppb)	50	97	103	49-121	6
4-Nitrophenol	ug/L (ppb)	75	42	49	16-64	15
4,6-Dinitro-2-methylphenol	ug/L (ppb)	50	94	100	32-148	6
Hexachlorobenzene	ug/L (ppb)	50	85	89	40-120	5
Pentachlorophenol	ug/L (ppb)	50	95	103	24-120	8
Pyrene	ug/L (ppb)	50	84	86	44-119	2
Benzo(a)pyrene	ug/L (ppb)	50	77	82	47-125	6

Note: The calibration verification result for benzoic acid and di-n-octyl phthalate exceeded 15% deviation. The average deviation for all compounds was not greater than 15%; therefore, the initial calibration is considered valid.

Date of Report: 04/08/08
Date Received: 03/27/08
Project: Fred Divine Salvage 521-07001-01, F&BI 803284

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL SUSPENDED SOLIDS BY METHOD 2540D

Laboratory Code: 803284-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
TSS	mg/L	68.9	74.2	7	0-20

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
TSS	mg/L	50	122	67-128

Date of Report: 04/08/08
Date Received: 03/27/08
Project: Fred Divine Salvage 521-07001-01, F&BI 803284

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	% Recovery LCS	% Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	ug/L (ppb)	2.5	90	96	52-135	6
Aroclor 1260	ug/L (ppb)	2.5	96	102	60-128	6

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probablility.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

APPENDIX D. ELECTRONIC DATA DISK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WA 98101

TARGET SHEET

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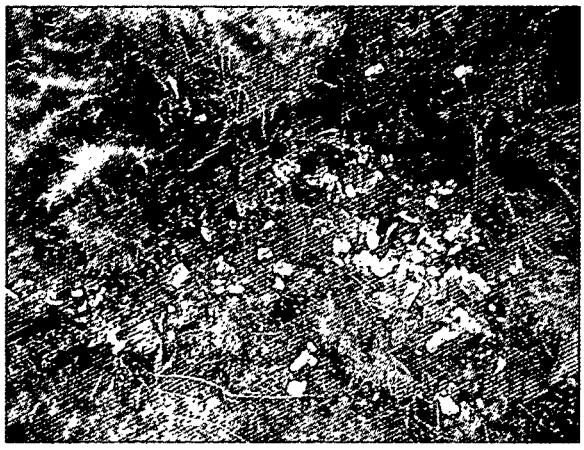

TECHNICAL MEMORANDUM
Wind-Blown Packaging Materials as Probable Source of Phthalates in Storm Water

Fred Devine Diving & Salvage, Co. Facility
6211 N. Ensign Street
Portland, Oregon 97217

July 25, 2008

Prepared for:

Fred Devine Diving & Salvage, Co.
6211 N. Ensign Street
Portland, Oregon 97217

Prepared by:

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TECHNICAL MEMORANDUM

Wind-Blown Packaging Materials as Probable Source of Phthalates in Storm Water

Fred Devine Diving & Salvage, Co. Facility
6211 N. Ensign Street
Portland, Oregon 97217

July 25, 2008

This technical memorandum has been prepared by EVREN Northwest, Inc., of Portland, Oregon, on behalf of:

Fred Devine Diving & Salvage, Co.
6211 N. Ensign Street
Portland, Oregon 97217

Project No. 521-07001-03

Prepared by:

EVREN NORTHWEST INC.
environmental natural resource consultants

Neil M. Woller, R.G., *Senior Hydrogeologist*

Lynn D. Green, *Senior Environmental Specialist*

CONTENTS

TECHNICAL MEMORANDUM

Wind-Blown Packaging Materials as Probable Source of Phthalates in Storm Water

Fred Devine Diving & Salvage, Co. Facility
6211 N. Ensign Street
Portland, Oregon 97217

1.0 INTRODUCTION

This technical memorandum presents the findings of work conducted to identify the source of phthalates detections in catch basin sediment and storm water, specifically benzyl butyl phthalate (BBP) and bis[2-ethylhexyl]phthalate (DEHP) at the Fred Devine Diving & Salvage (FDD&S) facility, 6211 N Ensign Street, Portland, Oregon (Figure 1). The site is located in the Swan Island industrial area and borders the Willamette River (Figure 2). Since the subject site is located adjacent to the Portland Harbor Superfund site, FDD&S and the Oregon Department of Environmental Quality have been evaluating storm water with respect to assessment and cleanup of the Portland Harbor.

2.0 FINDINGS OF LITERATURE REVIEW TO DETERMINE POTENTIAL SOURCES OF PHTHALATES IN STORM WATER

Phthalates are a group of chemical compounds used as plasticizers, which provide flexibility and durability to plastics. Phthalates in pure form are usually clear liquids, some with faint sweet odors and some with faint yellow color. With respect to health effects, phthalates are often classified as endocrine disruptors or hormonally-active agents because of their ability to interfere with the endocrine system in the body.[1,2]

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[1] U.S. Environmental Protection Agency (EPA). *Phthalates: TEACH Chemical Summary.* Last revised 10/10/2007: includes research articles through 2005, and other information through 2006.

[2] http://en.wikipedia.org/wiki/Phthalates

A literature review identified the following products that may contain phthalates (reference EPA[1] unless otherwise noted):

- Building materials
- Clothing
- Cosmetics (including nail polish[2])
- Perfumes
- Food packaging
- Toys
- Vinyl products (e.g., flooring, shower curtains, and rain coats)
- Tires[3]
- Rubber boots and shoes[4]
- Medical supplies (e.g., blood transfusion bags and tubing, intravenous fluid bags and tubing, and other medical devices)
- Lubricating oils, solvents (including solvents in pesticides[2]), and detergents
- Foamed flooring material[2] and wall lining material[6]
- Soft plastic fishing lures[2]
- Adhesives[2]
- Caulk[2]
- Paint pigments[2]
- Sealants[6]
- Various foils[6]
- Cable and wire sheathing[6]
- Office supplies[6]
- Plastic tarps[6]
- Steel (roof) gutter coatings[6]
- Underseal of vehicles[6]

As part of a storm water treatability research project, leaching tests of construction material were conducted.[5] The following materials were shown to leach phthalates:

- Untreated and treated plywood (detections included BBP and DEHP)
- Plexiglas and Plexiglas cement (detections included BBP and DEHP)
- Filter fabric material (detections included BBP)
- Sorbent pillows (detections included DEHP)
- Reinforced PVC tubing (detections included BBP)
- Fiberglass window screening (detections included DEHP)
- Delrin™ (detections included BBP)

King County, Seattle Public Utilities and the City of Tacoma conducted joint testing of various products and materials to help identify sources of phthalates in regional storm water.[6] Phthalates were detected in the following liquids:

- Used oil
- Unused motor oil
- Tire dressing
- Automated car wash product
- Cutting oils[7]

---

[3] Hwang and Young. 2004. *Organic contaminants from highway stormwater runoff.* Presented at The Society of Environmental Toxicology and Chemistry 25th Annual Meeting in North America.

[4] Danish Environmental Protection Agency. 2007. *Possible Control of EU Priority Substances in Danish Waters – Technical and economic consequences examined by three scenarios.* Environmental Project No. 1182, 2007.

[5] Pitt, Robert and Melinda Lalor. 2000. The Role of Pollution Prevention in Stormwater Management. Published in: *Models and Applications to Urban Water Systems, Monograph 9.* Edited by William James, CHI, Guelph, Ontario.

[6] King County Industrial Waste and Seattle Public Utilities. 2004. *King County and Seattle Public Utilities Source Control Program for the Lower Duwamish Waterway, June 2004 Progress Report.*

[7] Information for King County Local Hazardous Waste Program study.

The study also found phthalates in the following solids:

- Serpentine belts
- Used cigarette butts
- **Packing peanuts**
- Brake pads
- Brake pad dust
- Tires

DEHP was not found to be present in new cigarette butts, plastic bottles, asphalt or asphalt sealer. The Progress Report prepared by King County Industrial Waste and Seattle Public Utilities[6] included an analysis of packing peanuts in a sample obtained from Tacoma Recycling (see Attachment A). The sample contained 670-mg/Kg BBP and 18-mg/Kg DEHP.

The Sediment Phthalate Work Group[8] (Work Group) was formed in 2006 to address phthalate recontamination at sediment cleanup sites. In a *Summary of Findings and Recommendations*[9] the Work Group determined that phthalate sources are present throughout cities and dust in the air attracts phthalates. As indicated by this study, phthalates can be detected in storm water after a pathway of off-gassing, sorption to particulates and deposition on surfaces contacted by storm water.

3.0 PHTHALATES IN SEDIMENT AND STORM WATER AT THE FDD&S FACITLITY

In April 2002, sediment samples were collected from the six catch basins at the FDD&S facility; sample analysis included phthalates (see Table 1). The table shows impacts from BBP at up to 27.2 mg/Kg (milligrams per Kilogram) and DEHP at up to 172 mg/Kg. No additional sediment samples have been analyzed because storm water best management practices implemented at the site have included regular and routine cleaning of the catch basins; at each sampling attempt insufficient material has been present in catch basins to collect a sample.

In November 2007 and March 2008, FDD&S facility storm water was analyzed for phthalates (see Table 2). Note that in November 2007, a second sample was collected and analyzed at lower analytical method reporting limits to further assess impacts to storm water. The table shows impacts of up to 0.59 µg/L (micrograms per Liter) BBP and DEHP at up to 3.1 µg/L (estimated concentrations).

---

[8] The Sediment Phthalate Work Group is composed of the cities of Tacoma and Seattle, King County, Washington Department of Ecology and the U.S Environmental Protection Agency.

[9] Sediment Phthalate Work Group. 2007. *Summary of Findings and Recommendations*. September.

4.0 OBSERVATIONS OF FEBRUARY 21, 2008, SITE VISIT

ENW visited the FDD&S site on February 21, 2008, to investigate the source(s) of the phthalates in storm water. A photographic log of the site visit is presented as Attachment B.

ENW's visit immediately identified the likely source of phthalate concentrations in storm water: wind-blown polystyrene (Styrofoam) packing peanuts. As shown by the literature search presented in Section 2.0, packing peanuts have been shown to contain phthalates, and, as described in the rest of this section, the packing peanuts were observed in unusually large quantities at the site.

ENW initially observed packing peanuts inside a catch basin in the southeastern portion of the site. Further inspection of the property showed an abundant amount of "peanuts" on the northeast side of the site which is adjacent to a UPS facility. This property boundary is fenced with chain-link; "peanuts" were observed on both sides of the fence.

Shallow excavations with a shovel in landscaped areas of the subject site showed that the "peanuts" were not limited to the ground surface, but were present even within shallow subsurface soils (up to approximately one-foot depth; see photos in Attachment A). Where shrubbery, fencing, or other obstructions were present to catch the wind-borne debris, the concentration of "peanuts" was especially high. The adjacent (Port of Portland) property was also observed to have substantial wind-blown packaging debris, including packing peanuts.

The apparent source of the packaging materials was inferred to be the UPS facility, based on the location of the debris along the fence line and north/northeast side of wind-catch objects. FDD&S operations do not include the use of packing peanuts, and the only packing peanuts onsite are received occasionally with shipped office supplies, which are then appropriately disposed.

5.0 SAMPLING OF PACKING PEANUTS AT FDD&S FACILITY

Based on site observations and the literature search information on packing peanuts, packing peanuts were preliminarily identified as a potential source of phthalates in storm water at the FDD&S site. ENW conducted two (2) sampling events to determine if the packing peanuts were the source of phthalates in storm water leaving the site.

On February 21, 2008 ENW collected three (3) composite samples of packing peanuts from three areas on the subject site:

- Along the property boundary with UPS.
- From a landscaped area on the east side of the warehouse.
- From a landscaped area on the east side of the office building.

These composite samples were analyzed to determine the concentration of phthalates in packing peanuts (see Table 3).

On June 12, 2008, ENW collected eight (8) composite samples of packing peanuts from four (4) areas on the subject site:

- Along the property boundary with UPS.
- From a landscaped area on the east side of the warehouse.
- From a landscaped area on the east side of the office building.
- From a landscaped area on the north side of the office building.

These eight (8) composite samples were further composited into a single sample by the laboratory and a SPLP (Synthetic Precipitation Leaching Procedure; EPA Method 1312) analysis was conducted on that sample.

5.1 Sample Collection Methodology

ENW performed the composite sampling activities using a nitrile-gloved hand. Samples were selected for laboratory analysis by picking from landscaping material, removing soil and other materials adhering to the peanuts by hand, to the maximum extent practical, and were immediately transferred to laboratory-supplied glass containers with Teflon-lined caps. The containers were immediately sealed with minimal interior headspace. The samples were each marked with a distinctive designation, the date, time, project number, and sampler's name, and then immediately placed in cooled storage until delivered to the laboratory under chain-of-custody protocols.

5.2 Sample Analysis

Laboratory analyses were performed by Friedman & Bruya, Inc. of Seattle, Washington. Samples collected on February 21, 2008 were analyzed for phthalates using EPA method 8270C. Samples collected on April 28, 2008 were combined into a single composite sample by the laboratory and extracted using EPA Method 1312. EPA Method 1312, the Synthetic Precipitation Leaching Procedure (SPLP), is used to evaluate the potential for leaching constituents into ground and surface waters. This method provides a more realistic assessment of constituent mobility under actual field conditions (i.e. during storm events). The extraction fluid is intended to simulate precipitation.

The SPLP extract was then analyzed per EPA method 8270C. Laboratory reports from these two (2) events are included in Attachment C.

5.3 Analytical Results of Packing Peanut Composite Samples

Table 3 shows the analytical data for composite packing peanut samples collected from the FDD&S facility to date. Phthalates were detected: BBP at up to 1,200 mg/Kg and DEHP at up to 7.3 mg/Kg (estimated concentration[10]).

Table 4 shows the analytical data for the SPLP analysis of the packing peanut composite sample. Phthalates were present in the SPLP leachate above method reporting limits. Specifically, diethylphthalate was detected at a concentration of 4.2 µg/L, di-n-butylphthalate was detected at a concentration of 4.0 µg/L, BBP was detected at a concentration of 14 µg/L, and DEHP was detected at a concentration of 3.6 µg/L.

6.0 DISCUSSION OF PACKING PEANUTS

Foam packing peanuts are usually made of extruded polystyrene (trade name Styrofoam), though more environmentally friendly starch-based alternatives are available.[11,12]

The packing peanut samples collected from the FDD&S site contained concentrations of two (2) phthalates, BBP and DEHP, a composition finding similar to that of the packing peanut analysis of King County Industrial Waste and Seattle Public Utilities[6] at the Tacoma Landfill. BBP and DEHP were the only two (2) phthalates detected in storm water and catch basin sediment at the FDD&S site. BBP and DEHP were detected in the SPLP packing peanut extract, demonstrating that packing peanuts are capable of leaching BBP and DEHP to the sediments and storm water on the site, and, in particular, to the sediments and storm water within the storm-water collection system in which they are all found together. The other two (2) phthalates detected by SPLP analysis of the packing peanut sample collected from the FDD&S site were flagged by the laboratory as being present in the analytical method blank, and were not detected in FDD&S storm water or sediments.

As indicated in Section 2.0, there are abundant other potential sources of phthalates identified in the literature, to the extent that phthalates are considered ubiquitous in the environment. However, many of the identified potential sources are not present at the FDD&S site or if present (e.g., lubricating oils, detergents, fiberglass, etc.), are not stored in a manner that generally have extended exposure to storm events and/or a pervasive presence on the property.

Further evidence that the packing peanuts are the mostly likely source of phthalates in storm water at the FDD&S site is supported by comparing the phthalate chemical signature of

---

[10] DEHP was also noted to have been detected in the laboratory method blank. This detection further demonstrates the ubiquitous nature of phthalates in the environment. This detection also means that all reported concentrations of DEHP in composite samples are estimates.

[11] http://en.wikipedia.org/wiki/Foam_peanut

[12] http://en.wikipedia.org/wiki/Polystyrene

packing peanuts, storm water discharge and other potential sources. King County Industrial Waste and Seattle Public Utilities[6] includes in its Tables 15 and 16 bulk analytical data from a variety of potential sources for phthalates (method detection limits of 1 to 10 mg/Kg for solid sources and 1 to 10 mg/L for liquid sources). Tire dressings, carwash products and rinsate, dish soap, and coffee maker products typically contain diethyl phthalate, which has not been detected at the FDD&S site. Boat gray water and brake pads were found to contain di-n-butyl phthalate as well as BBP and DEHP; di-n-butyl phthalate was not detected at the subject property. Driveway and asphalt sealer products were found to have no detectable phthalate signatures. Used engine oil was found to only contain DEHP; however at a concentration below the laboratory reported detection limit so the detection is estimated. The report does note, however, DEHP transport and deposition by atmospheric processes, as suggested by sampling performed on the Tacoma Dome's dome before and after cleaning.

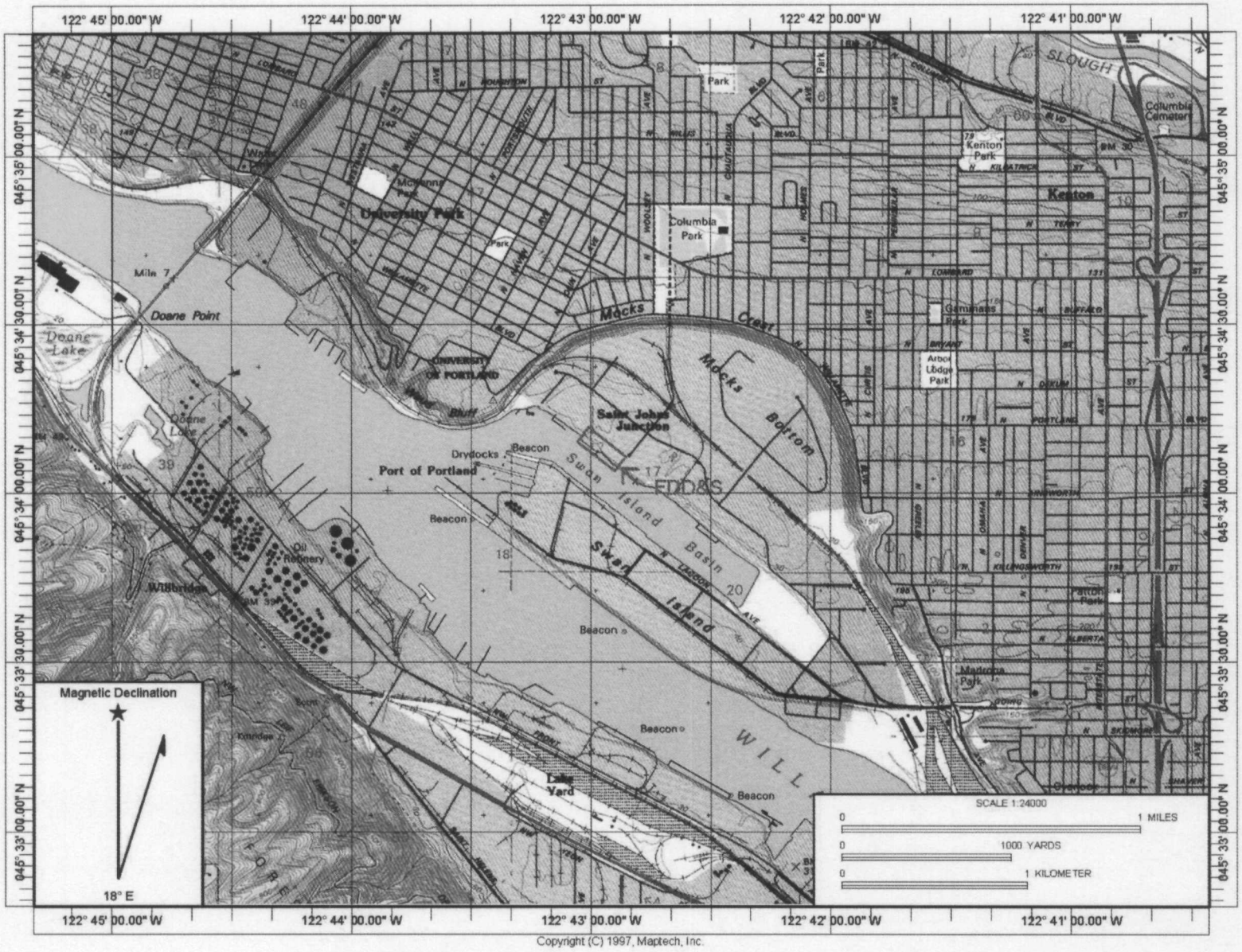
In summary, the matching chemical signature, leachability of BBP and DEHP from packing peanuts, the wide-spread distribution of packing peanuts throughout the FDD&S property (even within the storm-water collection system), strongly suggests that the packing peanuts were the source of the phthalate impacts to storm water and catch basin sediments.

The distribution of peanuts on both sides of the fence between the UPS and FDD&S sites, the presence of abundant peanuts on other adjacent sites, the observed correlation with peanut distribution and thickness with wind-catch features of the subject site, and prevalent wind direction from May through October from the north or northwest[13] strongly suggest the adjacent UPS site is the source of fugitive Styrofoam peanuts in the vicinity of the subject property.

[13] Western Regional Climate Center, Reno, Nevada

FIGURES

FIGURES

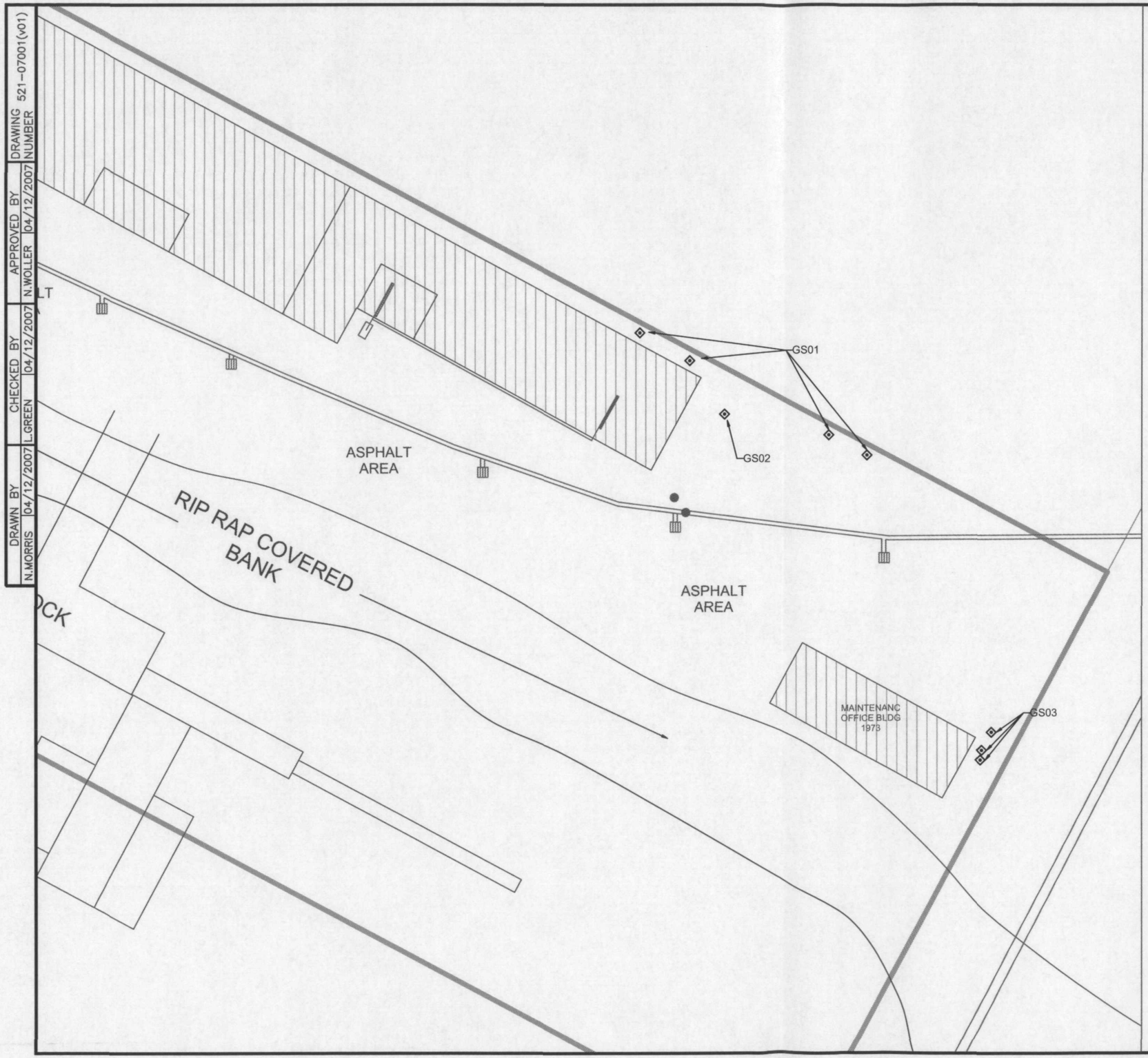


Copyright (C) 1997, Maptech, Inc.

Source: USGS Topographic Map, 7.5-Minute Portland Quadrangle, 1990

EVREN NORTHWEST	Date Drawn: 4/11/2008 CAD File Name: 521-07001-01svmap.doc Drawn By: LDG Approved By: NMW	Fred Devine Diving & Salvage Co. 6211 N. Ensign Street Portland Oregon For: The Marine Salvage Consortium, Inc.	**Site Vicinity Map**	Project No. 521-07001-01 Figure No. **1**

DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
N.MORRIS	04/12/2007	L.GREEN	04/12/2007	N.WOLLER	04/12/2007	521-07001(v01)



LEGEND:

- APPROXIMATE BUILDING LOCATIONS
- APPROXIMATE PROPERTY BOUNDARIES
- APPROXIMATE SUBJECT PROPERTY BOUNDARIES
- APPROXIMATE SUBJECT BUILDINGS
- CATCH BASIN
- STORM/DRAIN LINES
- DISCRETE SAMPLE LOCATION (COMPONENT OF COMPOSITE SAMPLE)

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2005 AND EVREN NORTHWEST, INC FIELD NOTES.

APPROXIMATE SCALE

0 75 150 FEET

N

EVREN NORTHWEST
PO BOX 80747
PORTLAND, OREGON 97280-1747
(503)452-5561 Fax(503)452-7669

FIGURE 2

SITE PLAN

FRED DIVINE DIVING & SALVAGE FACILITY
6211 NORTH ENSIGN STREET
PORTLAND, OREGON

TABLES

TABLES

Table 1 - Summary of Analytical Data, Catch Basin Sediment

Location ID	Catch Basin # 1	Catch Basin # 2	Catch Basin # 3	Catch Basin # 4	Catch Basin # 5	Catch Basin # 6	Maximum Sediment Concentration	Lowest JSCS Screening Level or ODEQ Sediment Bioaccumulation Screening Level	COPC?	Generally Accepted and Achievable Laboratory Detection Limits prepared by the Lower Willamette Group* (all in mg/Kg)			
Sample ID	CB-1	CB-2	CB-3	CB-4	CB-5	CB-6							
Date Sampled	4/30/2002	4/30/2002	4/30/2002	4/30/2002	4/30/2002	4/30/2002							
Depth Sampled (feet)	NA	NA	NA	NA	NA	NA							
Sample By	Evergreen	Evergreen	Evergreen	Evergreen	Evergreen	Evergreen							
Location	Catch Basin # 1	Catch Basin # 2	Catch Basin # 3	Catch Basin # 4	Catch Basin # 5	Catch Basin # 6							
Constituent of Interest	mg/Kg (ppm)						mg/Kg (ppm)	mg/Kg (ppm)	Y / N	ACG	MDL	MRL	PQL
Phthalate Esters													
Dimethylphthalate	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	20	tbd	0.02	0.01
Diethylphthalate	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.6	(Y)	NE	tbd	0.02	0.01
Di-n-butylphthalate	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.1	(Y)	0.204	tbd	0.02	0.02
Butylbenzylphthalate	<6.7 (ND)	NA	<6.7 (ND)	27.2	NA	<6.7 (ND)	27.2	NE	N	0.4	tbd	0.02	0.01
Di-n-octylphthalate	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.0409	tbd	0.02	0.02
Bis[2-ethylhexyl]phthalate	**27.6**	NA	**172**	**18.7**	NA	<6.7 (ND)	172	0.33	Y	0.0034	tbd	0.02	0.02

Notes:

ND = not detected at or above laboratory method reporting limits

— = not analyzed or not applicable.

NE = not established.

mk/Kg = milligrams per kilogram

JSCS = Portland Harbor Joint Source Control Strategy, ODEQ and EPA, December 2005

Bolded concentrations exceed JSCS screening levels (indicated with a Y)

(Y) indicates analyte not detected, but detection limit is above screening concentration.

* Portland Harbor RI/FS, June 24, 2004, Table A6-2, Analytes, Analytical Concentration Goals and Method Reporting Limits for Sediment Samples

ACG = Analytical Concentration Goals

MDL = Method Detection Limit

MRL = Method Reporting Limit

PQL = Practible Quanitation Limit

tbd = to be determined

Table 2 - Summary of Analytical Data, Storm Water

Location ID	SP01		SP01		SP01		SP01		Maximum Storm Water Concentration	Geometric Mean(1/2 MDL used if ND)	Lowest JSCS Screening Value
Sample ID	**SP01-071116**		**SP-1**		**SP-1**		**0SP01-080520**				
Date Sampled	**11/16/2007**		**11/28/2007**		**3/26/2008**		**5/20/2008**				
	Concentration	Method Detection Limit	Concentration	Method Detection Limit	Concentration	Method Detection Limit	Concentration	Method Detection Limit			
Constituent of Interest	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)
Phthalate Esters											
Dimethylphthalate	<1 (ND)	*1*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<1 (ND)	0.3	3
Diethylphthalate	<1 (ND)	*1*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<1 (ND)	0.3	3
Di-n-butylphthalate	<1 (ND)	*1*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<1 (ND)	0.3	3
Butylbenzylphthalate	<1 (ND)	*1*	0.59	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	0.59	0.42	3
Di-n-octylphthalate	<1 (ND)	*1*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<0.5 (ND)	*0.5*	<1 (ND)	0.3	3
Bis[2-ethylhexyl]phthalate	<10 (ND)	*10*	**2.9**	*0.5*	**3.1 J, fb**	*0.5*	**3.1 fbs**	*0.5*	3.1	**3.6**	0.22

Notes:

ND = not detected at or above laboratory method reporting limits

µg/L = micrograms per Liter

JSCS = Portland Harbor Joint Source Control Strategy, ODEQ and EPA, December 2005

Table 3 - Summary of Analytical Data, Packing Peanut Composite Samples

Location ID	GS01				GS02				GS03				Maximum Concetnration	Lowest JSCS Screening Value
Sample ID	GS01-080226				GS02-080226				GS03-080226					
Date Sampled	2/26/2008				2/26/2008				2/26/2008					
	Concentration	Method Detection Limit	Concentration	Method Detection Limit	Concentration	Method Detection Limit	Concentration	Method Detection Limit	Concentration	Method Detection Limit	Concentration	Method Detection Limit		
Constituent of Interest	mg/Kg (ppm)				mg/Kg (ppm)				mg/Kg (ppm)				mg/Kg (ppm)	mg/Kg (ppm)
Phthalate Esters														
Dimethylphthalate	<36 (ND)	36	<4 (ND)	4	<36 (ND)	36	<4 (ND)	4	<60 (ND)	60	<6 (ND)	6	<60 (ND)	NE
Diethylphthalate	<36 (ND)	36	<4 (ND)	4	<36 (ND)	36	<4 (ND)	4	<60 (ND)	60	<6 (ND)	6	<60 (ND)	0.6
Di-n-butylphthalate	<36 (ND)	36	<4 (ND)	4	<30 (ND)	30	<4 (ND)	4	<60 (ND)	60	<6 (ND)	6	<60 (ND)	0.1
Benzyl butyl phthalate (BBP)	<36 (ND)	36	<4 (ND)	4	**500**	36	**290**	4	**1,200**	36	**580**	6	1,200	NE
Di-n-octylphthalate	<36 (ND)	36	<4 (ND)	4	<36 (ND)	36	<4 (ND)	4	<60 (ND)	60	<6 (ND)	6	<60 (ND)	NE
Bis[2-ethylhexyl]phthalate	<360 (ND)	360	2.6 j, fb	4	<360 (ND)	360	4 j, fb	4	<600 (ND)	600	7.3 fb	6	7.3 fb	0.33

Notes:

ND = not detected at or above laboratory method reporting limits

µg/L = micrograms per Liter

JSCS = Portland Harbor Joint Source Control Strategy, ODEQ and EPA, December 2005

j = detection is below normal reporting limits and the concentration is an estimate

fb = the analyte was also detected in the method blank; concentration shown is an estimate

Table 4 - Summary of Analytical Data, Packing Peanut SPLP Sample

Location ID	FDD&S (composition sample)		Maximum Storm Water Concentration
Sample ID	COMP-080428		
Date Sampled	4/28/2008		
	Concentration	Method Detection Limit	
Constituent of Interest	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)
Phthalate Esters			
Dimethylphthalate	<1 (ND)	1	<1 (ND)
Diethylphthalate	4.2 fb	1	<1 (ND)
Di-n-butylphthalate	4.0 fb	1	<1 (ND)
Benzyl butyl phthalate (BBP)	14	1	0.59
Di-n-octylphthalate	<1 (ND)	1	<1 (ND)
Bis[2-ethylhexyl]phthalate	3.6 fb	1	3.1

Notes:

ND = not detected at or above laboratory method reporting limits

NE = not established.

µg/L = micrograms per Liter

fb = the analyte was also detected in the method blank; concentration shown is an estimate


A

ATTACHMENT A ANALYTICAL DATA FOR PACKING PEANUTS FROM KING COUNTY INDUSTRIAL WASTE AND SEATTLE PUBLIC UTILITIES 2004 STUDY

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TABLES

Table 6. Surface Water Quality Complaints.

Call Date	Material	Location	Zip	CSO/SD	Status
04/14/03	Soapy water	5220 S Dawson St	98108	CSO	Unresolved
04/14/03	Paint	2415 S Dawson st		CSO	resolved
05/08/03	Oil	165 19th Av	98122	CSO	Unresolved
07/03/03	Paint	4206 Rainier Av S	98118	CSO	Unresolved
07/23/03	Dirty water	555 16th Av	98122	CSO	Resolved
07/31/03	Drywall	620 S Dakota St	98108	SD	Resolved
08/08/03	White substance	620 S Dakota St	98108	SD	Unresolved
08/08/03	Possiblly illegal auto repairs (oil and other fluids)	2825 Rainier Ave S	98144	SD	Resolved
08/21/03	Kitchen waste water	3230 17th Ave S	98144	CSO	resolved
09/18/03	Green Slime	Diagonal Ave S and 1st Ave S	98134	SD	Resolved
10/02/03	Oil in containers on pallets	Park lot behind Schucks at 2805 Rainier Ave S	98144	SD	Resolved
10/03/03	Granite cutting water with solvents	4426 6th Ave S	98108	SD	Resolved
10/07/03	Soapy water	5223 Rainier Ave S	98118	CSO	Resolved
10/27/03	Car Washing Liquids (Soap, scum, etc.)	4800 Block Rainier Ave S	98108	CSO	Resolved
11/05/03	Oil	2102 E Madison		CSO	Unresolved
11/19/03	Process wastewater	Dean and Poplar	98144	SD	Resolved
11/26/03	Gasoline	816 Poplar Pl. S	98144	SD	Resolved
11/26/03	Diesel	815 Poplar Pl S	98144	SD	Unresolved
12/10/03	Paint	4700 Block of 51st Ave S	98118	SD	Resolved
12/24/03	Auto fluids	S Mayflower and 48th Ave S	98118	SD	Resolved
12/29/03	Paint	3300 Cheasty Blvd	98108	CSO	Unresolved
01/12/04	Oil from car	Street in front of 2323 32nd Ave S.	98144	SD	Unresolved
01/16/04	Auto fluids	8115 11th Av S	98106	SD	Resolved
01/20/04	Auto fluids	S Hudson St & 37th Av S	98118	CSO	Unresolved
01/20/04	Auto fluids	48th Av S & S Mayflower	98118	SD	Resolved
02/05/04	Grey water or concrete waste water	Poplar PL S and S Dean St	98144	SD	Resolved
02/10/04	Turbid water	S. Massachusetts St and 15th Ave S	98144	SD	Resolved
02/11/04	Paint	2011 24th Ave S	98144	SD	Resolved
02/20/04	Back up of water along alley (during rain)	Alley between 12th and 15th Ave S	98108	CSO	Resolved
02/20/04	Oil from two underground oil tanks	Under apt bldg parking lot at 4364 15th Ave S	98108	SD	Unresolved
03/16/04	Paint	1132 Poplar Av S	98134	SD	Resolved
03/30/04	Oil	2022 12th Ave S	98144	SD	Resolved
04/20/04	Monobor chlorate (herbicide)	On/Near RR tracks along E Marginal Way S		SD	Unresolved
04/02/04	Chemical	21st Ave S and S Massachusetts St	98108	SD	Resolved
04/12/04	Grease	708 Rainier Ave S	98118	SD	Resolved
06/07/04	Oil leaks from 2 vehicles	3203 35th Ave S	98144	CSO	Resolved
05/20/04	Auto fluids	S Plum St & 33rd Av S	98118	CSO	Resolved
04/02/04	Exploded sewer line	Next to 3320 Beacon Ave S		SD	Resolved
05/28/04	Water	2500 Beacon Ave S	98144	SD	Resolved
06/02/04	Water	2122 19th Ave S	98144	SD	Resolved

Table 7. Construction Projects with Grading in Diagonal Ave S CSO/SD Basin
All Permits Active March 2003 - May 2004

Project	Basin	Permit Date Start	Permit Date End	Address			DCLU Proj Cost	Project Description
RAINIER VISTA	CSO	6/11/2003	9/16/2005	4500	M L KING JR	WY S	$31,078,597	CONSTRUCT AND OCCUPY LOW INCOME HOUSING, MIXED USE BLDG
2300290	SD	6/19/2003	12/19/2004	00833	DAVIS	PL S	$2,824,774	CONSTRUCT & OCCUPY TWO TWO-STORY APT
2207892	SD	2/6/2004	8/6/2005	00500	17TH	AV	$25,881,161	CONSTRUCTION ADDITION & SUBSTANTUAL ALTERATIONS TO SHELL & CORE
2207429	CSO	3/12/2003	9/12/2004	02702	16TH	AV S	$1,367,000	CONST OF A 160FT DEEP TEST SHAFT FOR SOUND TRANSIT
2204942	CSO	4/24/2003	10/24/2004	02821	S WALDEN	ST	$3,770,000	DEMOLISH APPROX. 19000 SQUARE FEET OF EXISTING
2301643	CSO	7/8/2003	1/8/2005	04721	RAINIER	AV S	$1,860,000	ADDITIONS AND ALTERATIONS TO SEATTLE PUBLIC LIBRARY "COLUMBIA"
2305679	CSO	10/8/2003	4/8/2005	03621	33RD	AV S	$1,500,000	DEMO 3 BLDGS AND 5,000 CY GRADING FOR MIXED USE BLDG
2400238	CSO	5/20/2004	11/20/2005	03642	33RD	AV S	$2,000,000	EXC AND SHORING FOR 7-STORY MIXED USE BUILDING
2107959	SD	9/23/2003	3/23/2005	03407	AIRPORT	WY S	$28,286,087	CONSTRUCT A 4-STORY O&M FACILITY FOR SOUND TRANSIT
2206223	CSO	6/20/2003	12/20/2004	00316	BROADWAY		$5,012,399	DEMOLISH BLDGS302, 316 & 322 BROADWAY AND CONSTRUCT CHILD CARE CTR
2304932	SD	1/22/2004	7/22/2005	00801	S DEARBORN	ST	$1,189,095	CONSTRUCT OFFICE/VEHICLE STORAGE BLDG.& OCCUPY
2301344	CSO	9/30/2003	3/30/2005	00917	E YESLER	WY	$2,178,900	CONSTRUCT COMMUNITY/CHILD CARE CENTER FOR SEATTLE

Table 8. Stormwater and wastewater phthalate data.
Units: ug/L

Sta ID	Land Use	n	Bis(2-ethylhexyl)phthalate Mean	Min	Max	Detects	Butylbenzylphthalate Mean	Min	Max	Detects	Diethylphthalate Mean	Min	Max	Detects
STORMWATER														
Thea Foss[a]														
SD-230	Comm	11	5.8	1.1	12	9	1.25	1	3	4	1.8	1	9.3	2
SD-235	Comm	10	5.6	1	16	8	1.26	1	2	4	2.4	1	7.30	5
SD-237A	Mix	10	3.3	1	5.4	6	1.01	1	1.1	2	1.9	1	7.9	4
SD-237B	Mix	10	2.8	1	4.7	6	1.10	1	2	1	1.6	1	6.8	1
SD-243	Ind	7	2.6	1.5	5	6	2.06	1	3.9	3	1	1	1	0
SD-245	Ind	10	4.2	2.4	15	8	63	20	130	8	1.3	1	2	4
SD-254	Ind	7	2.4	1.5	3.7	4	2.09	1	6.1	4	1.4	1	3.6	1
SR-520[b]	Highway	3	12.03	9.49	14.2	3	0.64	0.59	0.71	3	1.1	0.43	2.55	3
Diagonal Ave S CSO/SD[c]														
D057009	Mix	3	6.6	3.48	10.1	3	0.65	0.57	0.79	1	1	1	1	0
D057036	Mix	7	7.1	0.57	14.7	6	0.77	0.57	0.987	3	1	1	1	0
WASTEWATER														
Renton WWTP influent[d]		34	14.2	5.22	37.1	34								
West Point WWTP influent[e]		16	12.8	4.7	33.3	16								
KEY MH DATA[f]														
Dry Weather														
East Marginal		7.4	9	5.9	3.9	9	2.8	1.3	4.0	9	5.3	2.1	8.3	9
West Marginal		148	10	25.7	9.5	10	1.7	0.6	3.0	10	8.4	7.0	9.4	10
Duwamish		12.4	8	10.6	7.3	8	1.3	0.9	1.8	8	6.0	4.8	7.0	8
Wet Weather														
East Marginal		11.8	9	6.5	1.6	9	0.9	0.6	1.5	7	4.4	2.0	12.1	9
West Marginal		52.3	7	20.8	13.3	7	2.2	0.6	0.6	6	7.7	5.5	8.9	7
Duwamish		13.7	7	12.2	10.0	7	1.8	1.3	2.4	7	6.71	5.09	8.32	8

a. Samples collected 2001-2002 by City of Tacoma
b. Samples collected 4/8/03 by King County
c. Samples collected in 1995 by King County (from manholes at S Hinds St and S Horton St)
d. Samples collected 1998-2003 by King County (system fully separated)
e. Samples collected 1998-2003 by King County (system combined)
f. Samples collected 2003-204 by King County Industrial Waste.

Table 9. Diagonal Sediment Trap Results (2/03-3/04).

	SQS	CSL	ST1 E Marginal/S Oregon	ST2 Airport Way/6th Ave S	ST2 Grab in pipe	ST 2 (bottle #1)	ST2 (bottle #2)	ST3 S Forest	ST3 S Forest	ST5 S College/Rainier Ave	ST6 S Bush Pl/Rainier Ave	ST7 S Dakota/6th Ave S
Date deployed			02/01/03	02/01/03				02/01/03	10/13/03	02/01/03	02/01/03	10/13/03
Date removed			08/21/03	08/21/03	08/21/03	03/11/04	03/11/04	08/21/03	03/11/04	08/21/03	08/21/03	02/18/04
TOC (percent)			17	4.5	2.1	4.6	3.5	6.7	1.8	13	12	6.9
Metals (mg/kg DW)												
As	57	93	10 U	7 U	30 U	50 U	8 U	9 U	7 U	6 U	8 U	9
Cu	390	390	298	89.9	78	146	34.1	138	69	136	231	62.6
Pb	450	530	244	76	100	210	39	128	102	175	200	61
Hg	0.41	0.59	0.3	0.06 U	0.02 U	0.4 U	0.07 U	0.07	0.07 U	0.10	0.25	0.06 U
Zn	410	960	1,050	282	159	735	162	653	433	479	944	262
LPAH (mg/kg OC)												
Acenapthene	16	57	11 U	2 U	2 U	5 U	3 U	2 U	4 U	1 U	9 U	1 J
Acenaphthylene	66	66	11 U	2 U	2 U	5 U	3 U	2 U	4 U	1 U	9 U	1 U
Anthracene	220	1,200	11 U	6	2 U	5 U	3 U	3	4 U	1 U	9 U	1 U
Fluorene	23	79	11 U	2	2 U	5 U	3 U	2 U	4 U	1 U	9 U	1 J
Naphthalene	99	170	11 U	2 U	2 U	5 U	3 U	9	4 U	1 U	9 U	1 U
Phenanthrene	100	4,480	19	36	6	22	12	16	11	4	49	4
HPAH (mg/kg OC)												
Benzo(a)anthracene	110	270	11 U	24	5	18	8	11	6	3	27	2
Dibenzo(a,h)anthracene	12	33	11 U	2 U	2 U	5 U	3	2 U	4 U	1 U	9	1 U
Chrysene	110	460	18	29	6	30	12	15	11	4	42	3
Fluoranthene	160	1,200	35	60	10	65	25	24	22	8	76	6
Benzo(b)fluoranthene[a]	230	450	14	40	6	24	9	6	7	6	39	2
Benzo(k)fluoranthene			14	40	5	24	9	5	7	4	39	2
Benzo(g,h,i)perylene	31	78	11 U	3	2 U	10	5	2 U	5	2	14	1 J
Benzo(a)pyrene	99	210	11	24	4	20	9	2 U	6	4	28	2
Pyrene	1,000	1,400	32	53	10	30	13	24	11	7	68	4
Indeno(1,2,3-c,d)pyrene	34	88	11 U	5	2	10	6	2 U	4 J	4	16	1 J
Phthalates (mg/kg OC)												
Bis(2-ethylhexyl)phthalate	47	78	394	400 E	133	283	40	269 E	256	68	350	35
Butylbenzylphthalate	4.9	64	17	27	2 U	10	4	30	7	3	28	3
Diethylphthalate	61	110	11 U	2 U	2 U	5 U	3 U	2 U	4 U	1 U	9 U	1 U
Dimethylphthalate	53	53	11 U	2	2 U	5 U	3 U	2	15	2	9	1 U
Di-n-butylphthalate	220	1,700	11 U	2	2 U	5 U	3	2 U	4 U	6	9 U	1 U
Di-n-octylphthalate	58	4,500	21	8	2 U	19	4	58 M	23	3	31	3
PCBs (mg/kg OC)	12	64										
Aroclor 1016			0.12 U	0.53 U	0.90 U	0.43 U	0.57 U	0.30 U	1.11 U	0.15 U	0.16 U	0.28 U
Aroclor 1242			0.12 U	0.53 U	0.90 U	0.43 U	0.57 U	0.30 U	1.11 U	0.15 U	0.16 U	0.28 U
Aroclor 1248			0.12 U	0.53 U	0.90 U	1.48 P	1.71 P	0.30 U	1.11 U	0.15 U	0.16 U	0.28 U
Aroclor 1254			0.50	2.13	1.71	0.98	0.60 J	1.94	2.78	1.00	0.70	1.42
Aroclor 1260			0.12 U	0.53 U	0.90 U	0.67	0.40 J	0.30 U	1.28 J	0.15 U	0.16 U	0.28 U
Aroclor 1221			0.24 U	1.09 U	1.81 U	0.43 U	0.57 U	0.58 U	1.11 U	0.30 U	0.32 U	0.28 U
Aroclor 1232			0.12 U	0.53 U	0.90 U	0.43 U	0.57 U	0.30 U	1.11 U	0.15 U	0.16 U	0.28 U
TPH (mg/kg)	***MTCA A***											
Diesel		2,000	620	88	50	370	87 U	560	380	600		
Motor Oil		2,000	1,100	230	110	2,400	570	1,400	1,200	1,200		

Exceeds CSL or MTCA Level A Cleanup
Exceeds SQS
a. SMS for total benzofluoranthenes

Table 10. Diagonal Ave S CSO/SD: Onsite CB sediment samples.

Source	Sample ID	Location	Cu (mg/kg)	Pb (mg/kg)	Hg (mg/kg)	Zn (mg/kg)	TPH-Diesel (mg/kg)	TPH-Oil (mg/kg)	PCBs (mg/kg OC)	BEHP[a] (ug/kg DW)	BEHP[a] (mg/kg OC)
Auto repair	CB7	2006 Rainier Ave S	647	1,220	0.1	1,150	9,900	13,000	0.28	140,000	824
	CB9	820 S Charlestown	177	105	0.06 U	294	50 U	300	3.59	2,200	81
	CB13	1410 Airport Way S	95.7	127	0.09	432	51	300	20.9	4,500	136
	CB19	5022 Rainier Ave S	405	1,530	1.82	1,170	3,500	13,000	2.63	53,000	482
Gas station	CB10	852 Rainier Ave. S	86.6	96	0.07	250	930	2,000	0.11 U	1,500	10
	CB23	4800 Beacon Ave S	86.6	73	0.07 U	501	800	3,900	0.24 U	3,400	40
	CB26	2220 E Union St	184	699	1.7	1,470	8,700	29,000	3.62	64,000	246
	CB27a	2220 E Union St	92.1	109	0.1	396	5,200	22,000	1.66	33,000	388
	CB29	700 12th Ave	261	164	0.09 U	668	5,000	21,000	0.26	63,000	558
Grocery stores	CB15	2901 Rainier Ave S	142	476	0.06 U	98.3	380	3,900	0.48 U	380	10
	CB18	5041 Wilson Ave S	79.9	55	0.22	359	970	6,100	0.21 U	20,000	225
	CB25	3820 Rainier Ave S	187	152	0.2	912	2,900	15,000	0.24	120,000	750
Vehicle/equip wash	CB2	4429 Airport WY S	1,520	1,110	0.5	2,720	34,000	71,000	0.53 U	200,000 B	2,667 B
	CB21	3151 Rainier Ave S	194	97	0.06 U	305	1,900	4,900	0.40 U	17,000	354
Transportation	CB3	635 S Edmunds St	29.6	10	0.05 U	54.9	15	52	8.30 U	130	28
	CB8	5200 E Marginal Wy	275	205	0.10	603	2,000	4,500	10.87	71,000	772
Misc retail	CB16	4801 Rainier Ave S	56.1	63	0.1	237	1,400	6,800	1.06	11,000	229
	CB20	4580 Beacon Ave S	184	277	1.16	754	2,100	7,800	1.94	99,000	990
	CB12	3701 7th Ave S	181	97	0.1	603	41	270	0.61	6,600	99
	CB28	1018 E Seneca St	254	327	0.2	677	440	3,100	0.13	14,000	103
Manufacturing	CB1	3414 4th Av S	161	125	0.3	1,100	NA	NA	0.62	19,000 B	100 B
	CB22	3711 S Hudson St	520	151	0.16	433	190	920	267	410	34
	CB31	3901 9th Ave S	186	231	0.12	590	200	670	3.47	460	12
Restaurant	CB27b	950 E Madison St	137	88	0.1 U	537	6,600	9,400	0.47 U	140,000	596
	CB32	3820 Rainier Ave S	194	131	0.2 U	874	770	3,000	0.10 U	34,000	164
Other	CB4	828 S Poplar Place	135	47	0.08 U	360	1,800	6,300	1.12 U	32,000	941
	CB5	828 S Poplar Place	147	51	0.2 U	412	2,600	9,200	0.27 U	67,000	447
	CB11	5005 3rd Ave S	325	445	0.68	3,940	370	2,100	4.11	6,200	100
	CB24	3515 S Alaska ST	172	299	0.2	699	730	5,700	0.92 U	12,000	156
	CB30	910 Boylston Ave	79.4	2,010	0.84	257	620	2,800	3.15	11,000	134
Transportation	CB33	3820 6 Ave. S	118	82	0.09	924	900	3,100	0.51	9,900	87
	CB34	12100 E Marginal Wy	98.7	110	0.07 U	833	430	2,400	0.21 U	4,200	45
	CB35	12100 E Marginal Wy	78.6	87	0.1	382	4,000	2,700	0.22 U	11,000	123
	CB36	12100 E Marginal Wy	201	152	0.07 U	420	5,300	14,000	0.19 U	24,000	226
Thea Foss basin (Tacoma)											
Auto repair/supplies (7)		Mean								58,371	
		Range								(2,600 - 340,000)	
Fast food (2)		Mean								74,000	
		Range								(48,000 - 100,000)	
Vehicle/equip wash (1)										24,000	
Misc retail (3)		Mean								14,100	
		Range								(1,800 - 35,000)	
Manufacturing (6)		Mean								106,083	
		Range								(9,100 - 580,000)	
SQS			390	450	0.41	410	NA	NA	12	NA	47
CSL			390	530	0.59	410	NA	NA	65	NA	78
MTCA Level A			NA	250	2	NA	2,000	2,000	NA	NA	NA

SQS

Exceeds CSL or MTCA Level A Cleanup Level (TPH)

a. Bis(2-ethylhexy)phthalate

NA = not applicable/not analyzed

Table 11. Right-of-Way CB Sediment Samples.

Road Type	Station ID	Cu (mg/kg)	Pb (mg/kg)	Hg (mg/kg)	Zn (mg/kg)	TPH-Diesel (mg/kg)	TPH-Oil (mg/kg)	PCBs (mg/kg OC)	BEHP[a] (ug/kg DW)	BEHP[a] (mg/kg OC)
Diagonal basin										
Industrial	RCB1	112	1,370	0.87	364	3,500	4,000	6.70	46,000	460
	RCB16	154	105	0.19	698	1,400	8,000	4.13	14,000	197
	RCB29	134	106	0.26	334	130	480	1.53	1,400	32
Freeway	RCB30	46.2	20	0.06 U	171	130	630	0.63 U	3,200	107
	RCB31	185	157	0.07	552	150	660	4.74	1,100	18
	RCB32	97.5	126	0.09 U	305	150	690	1.82	21,000	277
High traffic arterial	RCB2	40.1	121	0.07 U	137	270	1,600	0.55	2,900	53
	RCB3	48.8	78	0.07 U	179	200	1,400	0.37 U	2,400	46
	RCB7	55.1	374	0.06 U	142	210	1,600	0.83 U	2,100	88
	RCB11	117	92	0.07 U	243	540	3,000	0.27 U	3,200	23
	RCB10	183	109	0.1 U	589	630	4,600	1.16	28,000	280
	RCB12	112	77	0.1 U	384	540	3,000	0.51	5,600	96
	RCB13	172	163	0.17	567	1,200	7,800	1.67	17,000	177
	RCB15	157	145	0.2	761	1,400	9,100	3.68	18,000	219
	RCB17	137	146	0.15	534	1,400	7,200	3.04	12,000	158
	RCB18	229	137	0.13	575	1,700	8,500	2.51	14,000	141
	RCB19	71.9	64	0.05 U	252	470	2,600	1.48	5,900	137
	RCB20	164	206	0.2	759	1,800	11,000	1.31	24,000	168
	RCB21	38.4	39	0.07 U	132	390	2,500	0.31 U	4,300	70
	RCB27	159	111	0.06 U	335	560	2,400	0.37	12,000	201
Medium traffic	RCB6	46.4	46	0.06 U	176	380	2,800	0.40 U	4,000	85
	RCB9	42.5	53	0.04 U	151	160	1,900	0.43 U	970	21
	RCB26	40.2	136	0.06 U	84.7	1,800	4,500	0.29 U	1,300	20
	RCB24	41.4	316	0.31	226	400	1,400	0.34	1,100	15
	RCB25	53.1	25	0.07 U	120	290	1,200	0.34 U	1,900	34
Low traffic res	RCB4	167	245	0.30	851	460	1,600	0.18 U	3,600	30
	RCB5	66.6	197	0.32	362	260	2,400	0.18	2,400	22
	RCB22	97.2	65	0.06 U	176	230	1,500	0.45 U	3,100	66
	RCB28	76.9	131	0.2	313	140	910	0.29	4,100	33
	RCB23	81.6	180	0.12	277	690	2,500	0.22	8,700	81
Low traffic mix	RCB8	75.3	54	0.07 U	223	320	3,000	0.24	8,600	110
Thea Foss (Tacoma)										
Residential									4,825	
(8 samples)									(2,000 - 10,000)	
Commercial									21,000	
(5 samples)									(2,100 - 67,000)	
Industrial									13,250	
(14 samples)									(2,300 - 34,000)	
SQS		390	450	0.41	410	NA	NA	12	NA	47
CSL		390	530	0.59	410	NA	NA	65	NA	78
MTCA Level A		NA	250	2	NA	2,000	2,000	NA	NA	NA

a. Bis(2-ethylhexyl)phthalate

Exceeds SQS

Exceeds CSL or MTCA Level A Cleanup Level (TPH)

Table 15. Duwamish source tracing: Liquid product testing results.

	Drinking water through Barista maker		Dishwasher soap - McDonalds		Dish soap Ultra Joy with aromatic release		Dish soap Ultra Palmolive (antibacterial)		All purpose Cleaner Simple Green (concentrated)		Boat tap water		Boat grey water	
Phthalates (µg/L)														
Bis(2-ethylhexyl)phthalate	0.45	U	4,800	U	3,600	U	5,900	U	6,000	U	1.90	U	52	
Benzyl butyl phthalate	0.29	U	6,000	U	6,000	U	6,000	U	6,000	U	0.31	U	20	
Di-n-butyl phthalate	1.88		10,000	U	10,000	U	10,000	U	10,000	U	0.52	U	116	
Di-n-octyl phthalate	0.29	U	6,000	U	6,000	U	6,000	U	6,000	U	0.31	U	3.6	U
Diethyl phthalate	1.05		10,000	U	10,000	U	19,000	<RDL	10,000	U	0.52	U	6.0	U
Dimethyl phthalate	0.19	U	4,000	U	40,000	U	4,000	U	4,000	U	0.21	U	2.4	U
PAHs (µg/L)														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benzo(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenzo(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
Naphthalene														
Phenanthrene													4.4	
Pyrene														

Table 15. Duwamish source tracing: Liquid product testing results.

	Tire Dresser Black Magic Tire Wet		Tire Dressing 1		Tire Dressing 2		Automated car wash rinsate from Elephant Car wash		Car wax/soap, Turtle Wax 2 in 1 Wash Plus Wax		Car care product Armorall Protectant		Car Wash Soap, Mother's California Gold Car Wash	
Phthalates (µg/L)														
Bis(2-ethylhexyl)phthalate	10,000	U	10,000	U	10,000	U	7.98		5,100	U	3,900	U	9,600	U
Benzyl butyl phthalate	30,000	U	30,000	U	30,000	U	0.32	U	6,000	U	6,000	U	6,000	U
Di-n-butyl phthalate	50,000	U	50,000	U	50,000	U	0.53	U	10,000	U	10,000	U	10,000	U
Di-n-octyl phthalate	30,000	U	30,000	U	30,000	U	0.32	U	6,000	U	6,000	U	6,000	U
Diethyl phthalate	176,000		700,000		701,000		1.53		10,000	U	10,000	U	10,000	U
Dimethyl phthalate	20,000	U	20,000	U	20,000	U	0.21	U	4,000	U	4,000	U	4,000	U
PAHs (µg/L)														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benzo(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenzo(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
Naphthalene														
Phenanthrene									6,100					
Pyrene														

Table 15. Duwamish source tracing: Liquid product testing results.

	Automated car wash product Harmony Presoak 180 (elephant wash)		Automated car wash product Harmony Triple Coat		RainX		Clear Shield Windshield Fluid		Asphalt Sealer		Rainwater exposed to asphalt sealer		Driveway Sealer Henry 132 Driveway Coating	
Phthalates (µg/L)														
Bis(2-ethylhexyl)phthalate	2,000	U	302,000	U	10,000	U	5,100	U	10,000	U	1,200	U	10,000	U
Benzyl butyl phthalate	6,000	U	6,000	U	30,000	U	6,000	U	6,000	U	300	U	6,000	U
Di-n-butyl phthalate	10,000	U	10,000	U	50,000	U	10,000	U	10,000	U	500	U	10,000	U
Di-n-octyl phthalate	6,000	U	6,000	U	30,000	U	6,000	U	6,000	U	300	U	6,000	U
Diethyl phthalate	10,000	U	1,320,000		50,000	U	10,000	U	10,000	U	500	U	10,000	U
Dimethyl phthalate	4,000	U	4,000	U	20,000	U	4,000	U	4,000	U	200	U	4,000	U
PAHs (µg/L)														
Acenaphthene													871,000	
Acenaphthylene														
Anthracene													1,180,000	
Benzo(a)anthracene													1,260,000	
Benzo(a)pyrene													1,320,000	
Benzo(b)fluoranthene													1,500,000	
Benzo(g,h,i)perylene													787,000	
Benzo(k)fluoranthene													508,000	
Chrysene									9,000				1,150,000	
Dibenzo(a,h)anthracene													143,000	
Fluoranthene													5,360,000	
Fluorene													749,000	
Indeno(1,2,3-cd)pyrene													824,000	
Naphthalene									35,400				1,640,000	
Phenanthrene													5,930,000	
Pyrene													3,490,000	

Table 15. **Duwamish source tracing: Liquid product testing results.**

	New Penzoil Oil Synthetic		Used Penzoil Oil Synthetic		Car Engine Oil Mobil 1 5W-30		Car Engine Oil Valvoline SAE 20W-50		Spent automotive oils		Spent automotive oils		Tristar Exten (ink produc
Phthalates (µg/L)													
Bis(2-ethylhexyl)phthalate	10,000	U	75,000	<RDL	10,000	U	10,000	U	10,000	U	77,000	<RDL	6,300
Benzyl butyl phthalate	30,000	U	581,000		3,390,000		30,000	U	30,000	U	30,000	U	6,000
Di-n-butyl phthalate	50,000	U	50,000	U	50,000	U	50,000	U	50,000	U	50,000	U	10,000
Di-n-octyl phthalate	30,000	U	30,000	U	30,000	U	30,000	U	30,000	U	30,000	U	6,000
Diethyl phthalate	50,000	U	50,000	U	50,000	U	50,000	U	50,000	U	50,000	U	10,000
Dimethyl phthalate	20,000	U	20,000	U	20,000	U	20,000	U	20,000	U	20,000	U	4,000
PAHs (µg/L)													
Acenaphthene													
Acenaphthylene													
Anthracene			46,000										
Benzo(a)anthracene			98,000								<RDL		
Benzo(a)pyrene													
Benzo(b)fluoranthene													
Benzo(g,h,i)perylene													
Benzo(k)fluoranthene													
Chrysene			65,000										
Dibenzo(a,h)anthracene													
Fluoranthene			56,000								36,000		
Fluorene													
Indeno(1,2,3-cd)pyrene													
Naphthalene			194,000						110,000		357,000		
Phenanthrene			104,000								106,000		
Pyrene			118,000								85,000		

Table 15. Duwamish source tracing: Liquid product testing results.

	der, L)	Polycon Blue + Crude M31 (ink product)		Inxvelope Extender (ink product)		Inxvelope dense black (ink product)	
Phthalates (µg/L)							
Bis(2-ethylhexyl)phthalate	U	15,000	U	11,000	U	8,500	U
Benzyl butyl phthalate	U	6,000	U	6,000	U	6,000	U
Di-n-butyl phthalate	U	10,000	U	10,000	U	10,000	U
Di-n-octyl phthalate	U	6,000	U	6,000	U	6,000	U
Diethyl phthalate	U	10,000	U	10,000	U	10,000	U
Dimethyl phthalate	U	4,000	U	4,000	U	4,000	U
PAHs (µg/L)							
Acenaphthene							
Acenaphthylene							
Anthracene							
Benzo(a)anthracene							
Benzo(a)pyrene							
Benzo(b)fluoranthene							
Benzo(g,h,i)perylene							
Benzo(k)fluoranthene							
Chrysene							
Dibenzo(a,h)anthracene							
Fluoranthene							
Fluorene							
Indeno(1,2,3-cd)pyrene							
Naphthalene							
Phenanthrene							
Pyrene						21,800	

Table 16. Duwamish Source Tracing: Solid product testing results.

Source	Ford Motorcraft Serp Belt-new	New Cigarette butt Marlbro light 100	Used Cigarette butt Muni	Used Cigarette butt TDome	Plastic Bottles - Tacoma Recycling	Packing Peanuts Tacoma Recycling	Crafco Asphalt Sealer
BEP Phase 2 - ID #	021	022	023	024	025	026	027
Date Collected	1/12/2004	1/12/2004	1/12/2004	1/12/2004	1/9/2004	1/9/2004	1/12/2004
Conventionals							
Total solids (percent)	**98.9**	**92.1**	**89.8**	**90.4**	**99.6**	**100**	**98.8**
Phthalates (ug/kg DW)							
Bis(2-ethylhexyl)phthalate	**3,900**	5,400 U	**67,000** 10x	49,000 U 10x	810 U	**18,000**	16,000 U
Butylbenzylphthalate	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	**670,000**	16,000 U
Diethylphthalate	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Dimethylphthalate	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Di-n-butylphthalate	970 U	5,400 U	**200,000** 10x	**210,000** 10x	810 U	9,500 U	16,000 U
Di-n-octyl phthalate	970 U	5,400 UJ	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 UJ
LPAHs (ug/kg DW)							
2-Methylnaphthalene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Acenaphthene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Acenaphthylene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Anthracene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Fluorene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Naphthalene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Phenanthrene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
HPAHs in ug/kg							
Benzo(a)anthracene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Benzo(a)pyrene	970 U	5,400 UJ	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 UJ
Benzo(g,h,i)perylene	970 U	5,400 UJ	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 UJ
Benzo(b,k)fluoranthenes	970 U	5,400 UJ	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 BJ
Chrysene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Dibenzo(a,h)anthracene	970 U	5,400 UJ	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 UJ
Fluoranthene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U
Indeno(1,2,3-c,d)pyrene	970 U	5,400 UJ	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 UJ
Pyrene	970 U	5,400 U	49,000 U 10x	49,000 U 10x	810 U	9,500 U	16,000 U

The analyte was not detected at or above the reported value
The analyte was not detected at or above the reported estimated result
The analyte was positively identified. The associated value is an estimate
The analyte was quantitated based on the Internal Standard Phenanthrene-d10
Indicates the value is based on a 1:10 dilution

Table 16. Duwamish Source Tracing: Solid product testing results.

Source	US Oil Liquid Asphalt- NC600	US Oil Asphalt Cement
BEP Phase 2 - ID #	028	029
Date Collected	1/12/2004	1/12/2004
Conventionals		
Total solids (percent)	**83**	**100**
Phthalates (ug/kg DW)		
Bis(2-ethylhexyl)phthalate	19,000 UJ	20,000 UJ
Butylbenzylphthalate	19,000 UJ	20,000 UJ
Diethylphthalate	19,000 U	20,000 U
Dimethylphthalate	19,000 U	20,000 U
Di-n-butylphthalate	19,000 U	20,000 U
Di-n-octyl phthalate	19,000 UJ	20,000 UJ
LPAHs (ug/kg DW)		
2-Methylnaphthalene	**630,000**	20,000 U
Acenaphthene	19,000 U	20,000 U
Acenaphthylene	19,000 U	20,000 U
Anthracene	19,000 U	20,000 U
Fluorene	**19,000**	20,000 U
Naphthalene	**240,000**	20,000 U
Phenanthrene	19,000 U	20,000 U
HPAHs in ug/kg		
Benzo(a)anthracene	19,000 UJ	20,000 UJ
Benzo(a)pyrene	19,000 UJ	20,000 UJ
Benzo(g,h,i)perylene	**19,000** J	20,000 UJ
Benzo(b,k)fluoranthenes	19,000 UJ	20,000 UJ
Chrysene	**22,000** J	20,000 UJ
Dibenzo(a,h)anthracene	19,000 UJ	20,000 UJ
Fluoranthene	19,000 U	20,000 U
Indeno(1,2,3-c,d)pyrene	19,000 UJ	20,000 UJ
Pyrene	19,000 UP	20,000 UP

The analyte was not detected at or abo
The analyte was not detected at or abo
The analyte was positively identified. Th
The analyte was quantitated based on tl
Indicates the value is based on a 1:10 d

B

ATTACHMENT B PHOTOLOG

Packing peanuts were observed in the shallow subsurface soils in landscaped area along boundary with UPS.

Abundant peanuts observed in shallow excavation adjacent to a tree base in the shallow subsurface soils in landscaped area along boundary with UPS.

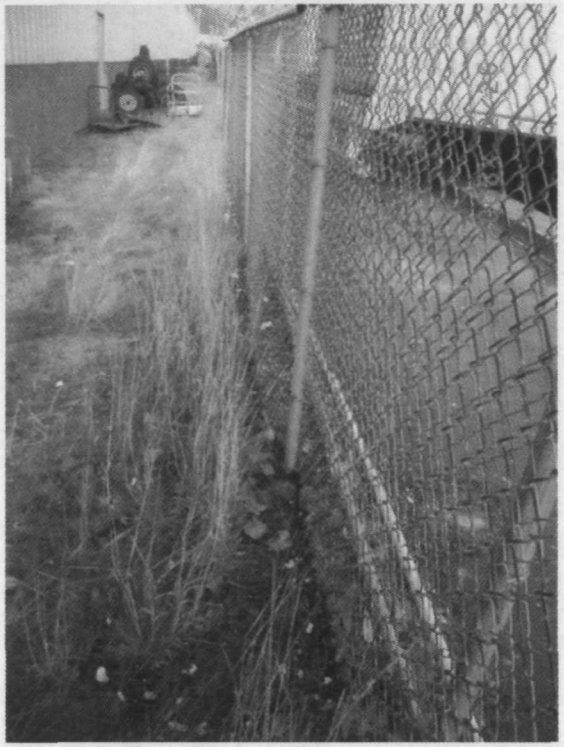
Close-up of previous photograph showing high concentration of peanuts in soil adjacent to tree base

UPS facility in background; abundant peanuts in soils along fence line.

EVREN NORTHWEST environmental natural resource consultants	Fred Devine Diving and Salvage 6211 N. Ensign Street Portland, Oregon 97217	**Site Photographs**	Project No. 521-07001-03 Attachment **A**

Close-up of previous picture, showing high concentration of peanuts in soil

UPS facility beyond fence, note peanuts in foreground



View along fence line bounding property; note abundant windblown peanuts migrated from beyond the fence originating at the UPS facility.

EVREN NORTHWEST INC. environmental natural resource consultants	Fred Devine Diving and Salvage 6211 N. Ensign Street Portland, Oregon 97217	**Site Photographs**	Project No. 521-07001-03 Attachment **A**

Another photograph along the fence line, showing abundant windblown peanuts migrated from the UPS facility beyond the fence.

Note abundant peanuts on far side of fence (UPS side of fence).

Adjacent to the FDDS warehouse (east side), abundant peanuts in soil adjacent to shrubbery

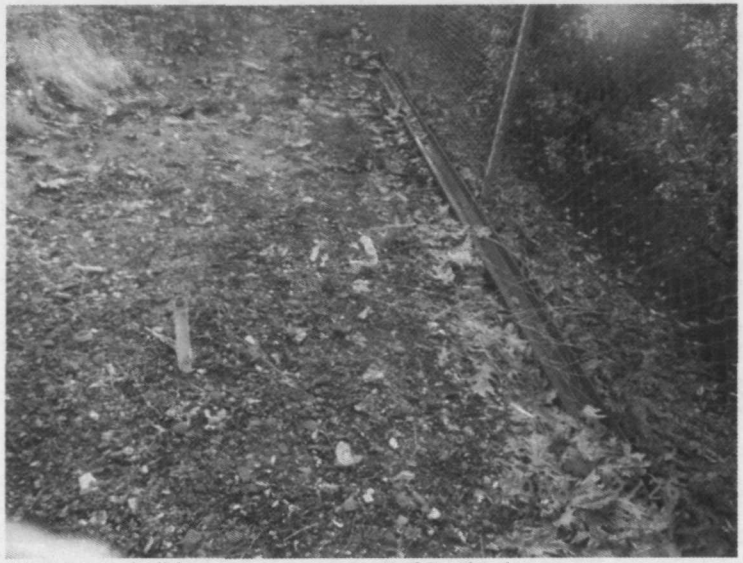
EVREN NORTHWEST environmental natural resource consultants	Fred Devine Diving and Salvage 6211 N. Ensign Street Portland, Oregon 97217	**Site Photographs**	Project No. 521-07001-03 Attachment **A**

Peanuts in storm water catch basin on FDD&S site

Peanuts in landscaped area on east side of offices

Abundant windblown peanuts on adjacent Port of Portland Property located further east

EVREN NORTHWEST INC. environmental natural resource consultants	Fred Devine Diving and Salvage 6211 N. Ensign Street Portland, Oregon 97217	**Site Photographs**	Project No. 521-07001-03 Attachment **A**



Abundant windblown peanuts on Port of Portland property neighboring FDDS

Photographs provided by Client

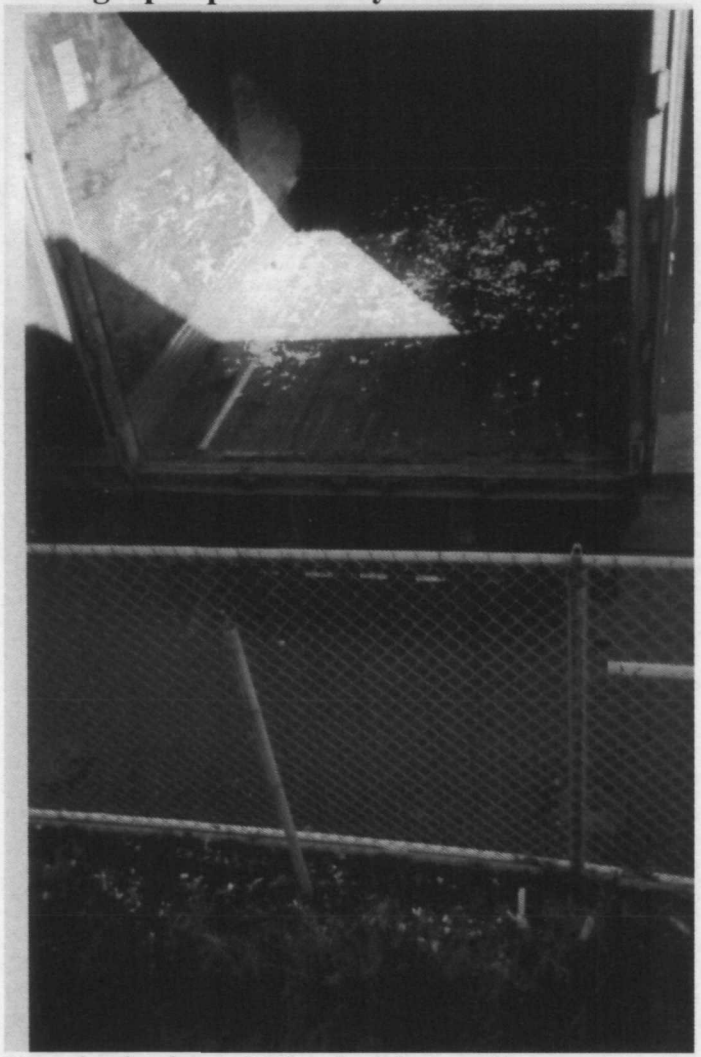


Photo showing doors of UPS trailer left open with peanuts in trailer. Note peanuts on asphalt behind trailer and along fence line on FDD&S property

EVREN NORTHWEST INC. environmental natural resource consultants	Fred Devine Diving and Salvage 6211 N. Ensign Street Portland, Oregon 97217	**Site Photographs**	Project No. 521-07001-03 Attachment **A**

Peanuts in landscaped area along northern property margin with UPS, note UPS trailers in background

Packing peanuts in landscaped area just south of northern property margin with UPS

EVREN NORTHWEST environmental natural resource consultants	Fred Devine Diving and Salvage 6211 N. Ensign Street Portland, Oregon 97217	**Site Photographs**	Project No. 521-07001-03 Attachment **A**

C

ATTACHMENT C ANALYTICAL DATA FOR PACKING PEANUTS FROM FDD&S PROPERTY

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

June 26, 2008

Lynn Green, Project Manager
Evren Northwest, Inc.
PO Box 80747
Portland, OR 97280

Dear Mr. Green:

Included are the results from the testing of material submitted on June 13, 2008 from the 521-07001-03, F&BI 806146 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

for
Bradley T. Benson
Chemist

Enclosures
c: Neil Woller, Mike Krzeminski
ENW0626R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on June 13, 2008 by Friedman & Bruya, Inc. from the Evren Northwest, Inc. 521-07001-03, F&BI 806146 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Evren Northwest, Inc.
806146-01	COMP01-080612

Several phthalates were detected in the method blank. The detections in the sample were flagged accordingly.

All other quality control requirements were acceptable.

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	COMP01-080612	Client:	Evren Northwest, Inc.
Date Received:	06/13/08	Project:	521-07001-03, F&BI 806146
Date Extracted:	06/19/08	Lab ID:	806146-01
Date Analyzed:	06/21/08	Data File:	062019.D
Matrix:	SPLP Extract	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Nitrobenzene-d5	87	55	115
2-Fluorobiphenyl	84	51	113
Terphenyl-d14	67	45	119

Compounds:	Concentration ug/L (ppb)
Dimethyl phthalate	<1
Diethyl phthalate	4.2 fb
Di-n-butyl phthalate	4.0 fb
Benzyl butyl phthalate	14
Bis(2-ethylhexyl) phthalate	3.6 fb
Di-n-octyl phthalate	<1

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	Method Blank	Client:	Evren Northwest, Inc.
Date Received:	Not Applicable	Project:	521-07001-03, F&BI 806146
Date Extracted:	06/19/08	Lab ID:	080970mb2
Date Analyzed:	06/21/08	Data File:	062017.D
Matrix:	SPLP Extract	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Nitrobenzene-d5	78	55	115
2-Fluorobiphenyl	84	51	113
Terphenyl-d14	80	45	119

Compounds:	Concentration ug/L (ppb)
Dimethyl phthalate	<1
Diethyl phthalate	0.6 j
Di-n-butyl phthalate	0.9 j
Benzyl butyl phthalate	<1
Bis(2-ethylhexyl) phthalate	0.2 j
Di-n-octyl phthalate	<1

Date of Report: 06/26/08
Date Received: 06/13/08
Project: 521-07001-03, F&BI 806146

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SPLP SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Phenol	ug/L (ppb)	75	29	31	18-54	7
2-Chlorophenol	ug/L (ppb)	75	62	68	47-103	9
1,4-Dichlorobenzene	ug/L (ppb)	50	70	82	47-105	16
2-Methylphenol	ug/L (ppb)	75	61	68	43-93	11
N-Nitroso-di-n-propylamine	ug/L (ppb)	50	72	78	49-115	8
4-Methylphenol	ug/L (ppb)	75	51	57	35-86	11
2-Nitrophenol	ug/L (ppb)	75	73	83	56-104	13
2,4-Dimethylphenol	ug/L (ppb)	75	64	75	27-101	16
Benzoic acid	ug/L (ppb)	75	21	20	10-53	5
2,4-Dichlorophenol	ug/L (ppb)	75	83	83	52-108	0
1,2,4-Trichlorobenzene	ug/L (ppb)	50	70	79	49-108	12
Naphthalene	ug/L (ppb)	50	71	83	48-117	16
4-Chloro-3-methylphenol	ug/L (ppb)	75	73	82	48-110	12
Hexachlorocyclopentadiene	ug/L (ppb)	50	60	62	16-117	3
2,4,6-Trichlorophenol	ug/L (ppb)	75	70	79	41-120	12
2,4,5-Trichlorophenol	ug/L (ppb)	75	72	84	54-118	15
Acenaphthene	ug/L (ppb)	50	71	84	23-130	17
2,4-Dinitrophenol	ug/L (ppb)	75	75	76	38-135	1
2,4-Dinitrotoluene	ug/L (ppb)	50	74	84	49-121	13
4-Nitrophenol	ug/L (ppb)	75	37	39	16-64	5
4,6-Dinitro-2-methylphenol	ug/L (ppb)	75	84	88	32-148	5
Hexachlorobenzene	ug/L (ppb)	50	70	76	40-120	8
Pentachlorophenol	ug/L (ppb)	75	75	76	24-120	1
Pyrene	ug/L (ppb)	50	67	79	44-119	16
Benzo(a)pyrene	ug/L (ppb)	50	71	81	47-125	13

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probablility.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

May 28, 2008

Lynn Green, Project Manager
Evren Northwest, Inc.
PO Box 80747
Portland, OR 97280

Dear Mr. Green:

Included are the amended results from the testing of material submitted on April 29, 2008 from the FDD&S 521-07001-03, F&BI 804297 project. Benzyl butyl phthalate was added to the reporting list.

We apologize for any inconvenience this may have caused and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

for
Bradley T. Benson
Chemist

Enclosures
c: Neil Woller, Mike Krzeminski
ENW0506R.DOC

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	COMP-080428	Client:	Evren Northwest, Inc.
Date Received:	04/29/08	Project:	521-07001-03, F&BI 804297
Date Extracted:	05/01/08	Lab ID:	804297-1-4c
Date Analyzed:	05/02/08	Data File:	050125.D
Matrix:	TCLP Extract	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	59	27	76
Phenol-d6	35	13	58
Nitrobenzene-d5	67	55	115
2-Fluorobiphenyl	66	51	113
2,4,6-Tribromophenol	75	28	107
Terphenyl-d14	64	45	119

Compounds:	Concentration ug/L (ppb)
Dimethyl phthalate	<3
Diethyl phthalate	<3
Di-n-butyl phthalate	4.1
Benzylbutyl phthalate	<3
Bis(2-ethylhexyl) phthalate	3.9 j, fb
Di-n-octyl phthalate	<3

Note: Compounds in the sample matrix interfered with the quantitation of the analytes. The values reported should be considered an estimate.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	COMP-080428	Client:	Evren Northwest, Inc.
Date Received:	04/29/08	Project:	521-07001-03, F&BI 804297
Date Extracted:	05/01/08	Lab ID:	804297-1-4c 1/10
Date Analyzed:	05/01/08	Data File:	050124.D
Matrix:	TCLP Extract	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	74	27	76
Phenol-d6	75	13	58
Nitrobenzene-d5	76	55	115
2-Fluorobiphenyl	75	51	113
2,4,6-Tribromophenol	76	28	107
Terphenyl-d14	73	45	119

Compounds:	Concentration ug/L (ppb)
Dimethyl phthalate	<30
Diethyl phthalate	<30
Di-n-butyl phthalate	<30
Benzylbutyl phthalate	<30
Bis(2-ethylhexyl) phthalate	<30 j
Di-n-octyl phthalate	<30

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	Method Blank	Client:	Evren Northwest, Inc.
Date Received:	Not Applicable	Project:	521-07001-03, F&BI 804297
Date Extracted:	05/01/08	Lab ID:	080668mb
Date Analyzed:	05/01/08	Data File:	050119.D
Matrix:	TCLP Extract	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	64	27	76
Phenol-d6	55	13	58
Nitrobenzene-d5	92	55	115
2-Fluorobiphenyl	90	51	113
2,4,6-Tribromophenol	91	28	107
Terphenyl-d14	87	45	119

Compounds:	Concentration ug/L (ppb)
Dimethyl phthalate	<1
Diethyl phthalate	<1
Di-n-butyl phthalate	<1
Benzylbutyl phthalate	<1
Bis(2-ethylhexyl) phthalate	0.6 j
Di-n-octyl phthalate	<1

806146

SAMPLE CHAIN OF CUSTODY

ME 6/13/08 C05

Send Report To LYNN D. GREEN

Company EVREN NORTHWEST, INC.

Address PO BOX 80747

City, State, ZIP PORTLAND, OR 97280-1747

Phone # (503)452-5561 Fax # (503)452-7669

SAMPLERS (signature): Mack of ENW

PROJECT NAME/NO.: S21-07001-03

PO #: S21-07001

REMARKS:

Page # ____ of ____

TURNAROUND TIME:
- (Standard ~~(2 Weeks)~~ wk per BnD)
- RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL:
- Dispose after 30 days
- Return samples
- Will call with instructions

SAMPLE ID	LAB ID	DATE	TIME	SAMPLE TYPE	# OF CONTAINERS	ANALYSES REQUESTED: TPH-HCID	TPH-GX	TPH-DX	BTEX	RBDM VOCS	VOCS (8260)	PAHS (SIM)	PCBS	METALS:	RCRA METALS	SVOCS (8270)	SGT	NOTES
COMP01-080612	01 A-L	6/12/08	1729	Peanuts Packing	12												X	

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Mackenzie Carlson	ENW	6/12/08	1730
Received by:	HONG NGUYEN	FBI	6/13/08	9:00
Relinquished by:				
Received by:				

Samples received at 17 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

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e-mail: fbi@isomedia.com

March 10, 2008

Lynn Green, Project Manager
Evren Northwest, Inc.
PO Box 80747
Portland, OR 97280

Dear Mr. Green:

Included are the results from the testing of material submitted on February 27, 2008 from the 521-07001-03 Fred Devine Salvage, F&BI 802277 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Bradley T. Benson
Chemist

Enclosures
c: Neil Woller, Mike Krzeminski
ENW0310R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on February 27, 2008 by Friedman & Bruya, Inc. from the Evren Northwest, Inc. 521-07001-03 Fred Devine Salvage, F&BI 802277 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Evren Northwest, Inc.
802277-01	GS01-080226
802277-02	GS02-080226
802277-03	GS03-080226

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	GS01-080226	Client:	Evren Northwest, Inc.
Date Received:	02/27/08	Project:	521-07001-03 Fred Devine Salvage
Date Extracted:	03/04/08	Lab ID:	802277-01 1/1200
Date Analyzed:	03/05/08	Data File:	030513.D
Matrix:	Solid	Instrument:	GCMS3
Units:	mg/kg (ppm)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	78	30	118
Phenol-d6	66	30	118
Nitrobenzene-d5	64	10	180
2-Fluorobiphenyl	80	40	130
2,4,6-Tribromophenol	0 ds	16	116
Terphenyl-d14	84	30	144

Compounds:	Concentration mg/kg (ppm)
Dimethyl phthalate	<36
Diethyl phthalate	<36
Di-n-butyl phthalate	<36
Benzyl butyl phthalate	<36
Bis(2-ethylhexyl) phthalate	<360
Di-n-octyl phthalate	<36

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	GS02-080226	Client:	Evren Northwest, Inc.
Date Received:	02/27/08	Project:	521-07001-03 Fred Devine Salvage
Date Extracted:	03/04/08	Lab ID:	802277-02 1/1200
Date Analyzed:	03/05/08	Data File:	030514.D
Matrix:	Solid	Instrument:	GCMS3
Units:	mg/kg (ppm)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	58	30	118
Phenol-d6	56	30	118
Nitrobenzene-d5	56	10	180
2-Fluorobiphenyl	72	40	130
2,4,6-Tribromophenol	0 ds	16	116
Terphenyl-d14	76	30	144

Compounds:	Concentration mg/kg (ppm)
Dimethyl phthalate	<36
Diethyl phthalate	<36
Di-n-butyl phthalate	<30
Benzyl butyl phthalate	500
Bis(2-ethylhexyl) phthalate	<360
Di-n-octyl phthalate	<36

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	GS03-080226	Client:	Evren Northwest, Inc.
Date Received:	02/27/08	Project:	521-07001-03 Fred Devine Salvage
Date Extracted:	03/04/08	Lab ID:	802277-03 1/2000
Date Analyzed:	03/05/08	Data File:	030515.D
Matrix:	Solid	Instrument:	GCMS3
Units:	mg/kg (ppm)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	64	30	118
Phenol-d6	58	30	118
Nitrobenzene-d5	56	10	180
2-Fluorobiphenyl	72	40	130
2,4,6-Tribromophenol	0 ds	16	116
Terphenyl-d14	76	30	144

Compounds:	Concentration mg/kg (ppm
Dimethyl phthalate	<60
Diethyl phthalate	<60
Di-n-butyl phthalate	<60
Benzyl butyl phthalate	1,200
Bis(2-ethylhexyl) phthalate	<600
Di-n-octyl phthalate	<60

Analysis For Semivolatile Compounds By EPA Method 8270C

Client Sample ID:	Method Blank	Client:	Evren Northwest, Inc.
Date Received:	Not Applicable	Project:	521-07001-03 Fred Devine Salvage
Date Extracted:	03/04/08	Lab ID:	080314 mb
Date Analyzed:	03/04/08	Data File:	030405.D
Matrix:	Solid	Instrument:	GCMS3
Units:	mg/kg (ppm)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	62	30	118
Phenol-d6	64	30	118
Nitrobenzene-d5	69	10	180
2-Fluorobiphenyl	62	40	130
2,4,6-Tribromophenol	58	16	116
Terphenyl-d14	58	30	144

Compounds:	Concentration mg/kg (ppm)
Dimethyl phthalate	<0.03
Diethyl phthalate	<0.03
Di-n-butyl phthalate	<0.03
Benzyl butyl phthalate	<0.03
Bis(2-ethylhexyl) phthalate	<0.3
Di-n-octyl phthalate	<0.03
2,6-Dinitrotoluene	<0.0

Date of Report: 03/10/08
Date Received: 02/27/08
Project: 521-07001-03 Fred Devine Salvage, F&BI 802277

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOLID SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Phenol	mg/kg (ppm)	2.5	56	61	49-103	9
2-Chlorophenol	mg/kg (ppm)	2.5	58	64	53-103	10
1,4-Dichlorobenzene	mg/kg (ppm)	1.7	60	65	52-104	8
2-Methylphenol	mg/kg (ppm)	1.7	57 vo	64	59-95	12
N-Nitroso-di-n-propylamine	mg/kg (ppm)	1.7	59	66	46-114	11
4-Methylphenol	mg/kg (ppm)	1.7	58	63	43-103	8
2-Nitrophenol	mg/kg (ppm)	1.7	63	67	63-100	6
2,4-Dimethylphenol	mg/kg (ppm)	1.7	55	59	35-94	7
Benzoic acid	mg/kg (ppm)	2.5	81	86	49-132	6
2,4-Dichlorophenol	mg/kg (ppm)	1.7	63	66	63-99	5
1,2,4-Trichlorobenzene	mg/kg (ppm)	1.7	63	66	54-106	5
Naphthalene	mg/kg (ppm)	1.7	63	68	56-110	8
4-Chloro-3-methylphenol	mg/kg (ppm)	1.7	64	69	54-109	8
Hexachlorocyclopentadiene	mg/kg (ppm)	1.7	53	59	34-114	11
2,4,6-Trichlorophenol	mg/kg (ppm)	1.7	60	65	43-110	8
2,4,5-Trichlorophenol	mg/kg (ppm)	1.7	65	71	64-110	9
Acenaphthene	mg/kg (ppm)	2.5	60	66	55-105	10
2,4-Dinitrophenol	mg/kg (ppm)	1.7	59	65	52-128	10
2,4-Dinitrotoluene	mg/kg (ppm)	1.7	62	68	53-115	9
4-Nitrophenol	mg/kg (ppm)	2.5	66	73	46-122	10
4,6-Dinitro-2-methylphenol	mg/kg (ppm)	1.7	61	68	52-133	11
Hexachlorobenzene	mg/kg (ppm)	1.7	64	71	49-110	10
Pentachlorophenol	mg/kg (ppm)	1.7	64	71	33-127	10
Pyrene	mg/kg (ppm)	1.7	57	61	53-110	7
Benzo(a)pyrene	mg/kg (ppm)	1.7	59	62	56-111	5

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probablility.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

802277

Friedmans & Breuza, Inc

ME 02/27/08

D02

Environmental Services Laboratory, Inc

CHAIN OF CUSTODY

12000 SW Tualatin Sherwood Road • Suite 210 • Portland, OR 97224 • (503) 670-8520 • FAX (503) 670-9243

Company: Ejlen NW

Project Manager: Ejlen green

LABORATORY #

Address: PO Box 80247

Phone: 503-452-5561 Fax: 452-2669

SAMPLE DISPOSAL INSTRUCTIONS

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	PETROLEUM HYDROCARBONS: NWTPH-HCID	NWTPH-GX	NWTPH-DX	8020M - BETX only	8270 SIMS PAHs	ORGANICS: Halogenated VOCs/GCMS	Aromatic VOCs/GCMS	8260 GCMS Volatiles	8270 GCMS Semivolatiles	8081 GC Pesticides/PCBs	8081m PCBs only	INORGANICS: RCRA Metals (8)	Priority Pollutant Metals (13)	Metals:	TCLP: TCLP Metals (8)	TCLP Volatiles 8260 ZH-EXT	TCLP Semivolatiles 8270	Arsenic by 8270	# OF CONTAINERS
GS01-080226	26Feb08	0919	Drinking Permits	01																		X	
GS02-	↓	0924	↓	02																		X	
GS03-	↓	0933	↓	03																		X	

Samples received at 14 °C

PROJECT INFORMATION	SAMPLE RECEIPT
PROJECT NUMBER: 51-07001-03	TOTAL NUMBER OF CONTAINERS
PROJECT NAME: Fred Dennis Service	COC SEALS INTACT? Y / N / NA
PURCHASE ORDER NUMBER: 51-07001	RECEIVED INTACT? Y / N
ONGOING PROJECT? YES ☒ NO ☐	RECEIVED COLD? Y / N

PRIOR AUTHORIZATION REQUIRED FOR RUSH PROJECTS

TAT (NORMAL) 2 WKS (RUSH) ☐ 24 HR ☐ 48 HRS ☐ 72 HRS ☒ 1 WK per Rmd

GREATER THAN 24 HR. NOTICE? YES ☐ NO ☐ (LAB USE ONLY)

SPECIAL INSTRUCTIONS:

Sampled by:

Received via:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
SIGNATURE: Time 1007	SIGNATURE: Time	SIGNATURE: Time
Printed Name: Date 26Feb08	Printed Name: Date	Printed Name: Date
Company: ENW	Company:	Company:
RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time 09:30	Signature: Time	Signature: Time
Printed Name: Date Nhan Phan 2/27/08	Printed Name: Date	Printed Name: Date
Company: FEBI	Company:	ESL Inc.:

DISTRIBUTION: White, Canary - ESL, Pink - Originator